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# Dental Digest

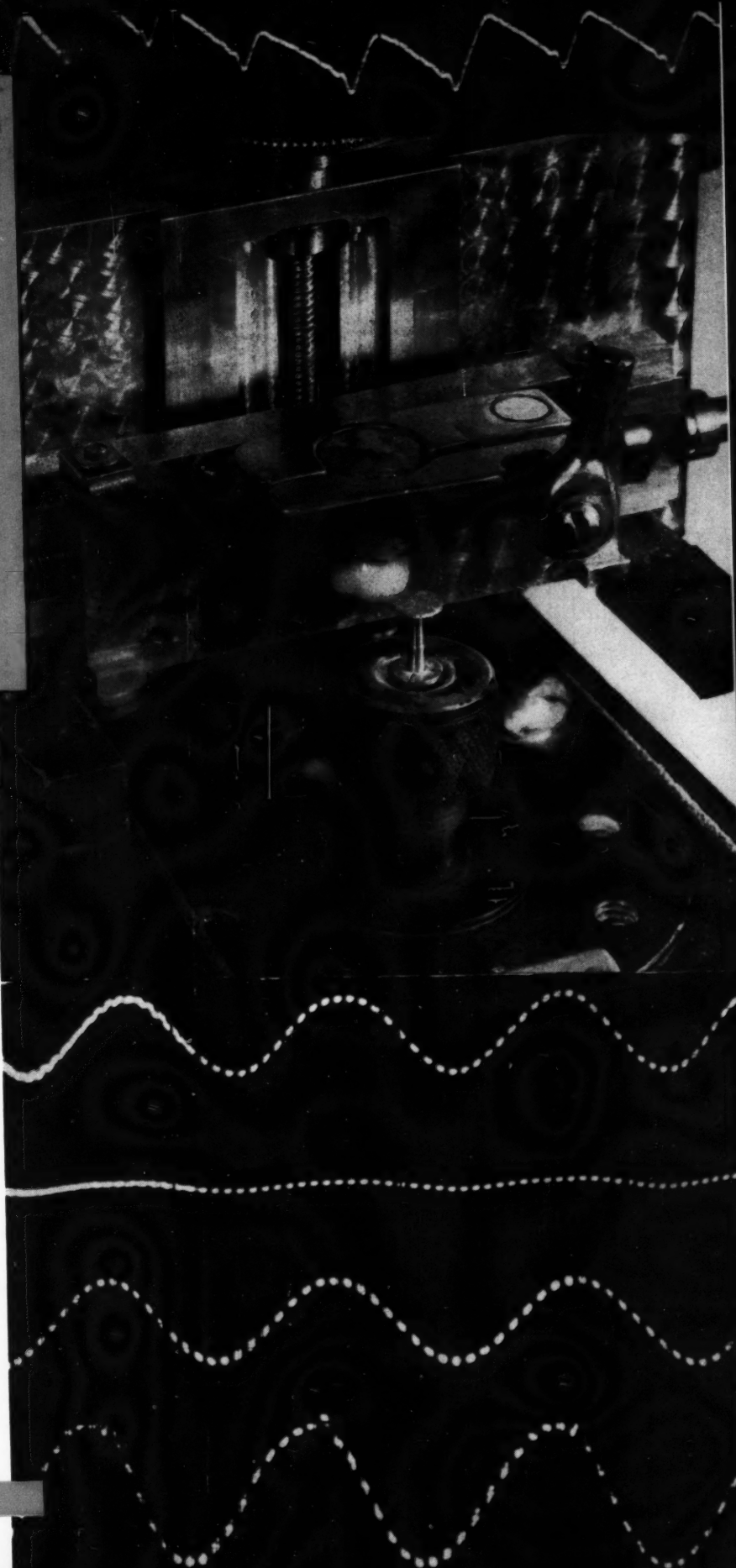
**March 1956**

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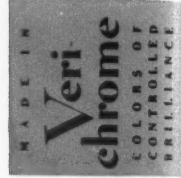
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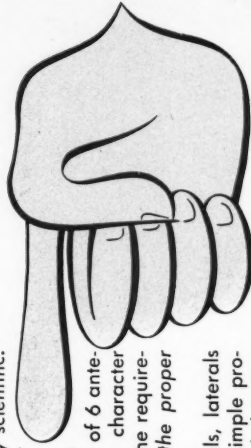
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Vol. 62, No. 3

# Dental Digest

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**MARCH 1956**

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CHARLES SOMERVILLE DILLON, D.D.S. (Baltimore College of Dental Surgery, Dental School, University of Maryland, 1931), L.D.S. (Royal Faculty of Physicians and Surgeons, 1938) is known to DIGEST readers for his former articles on aspects of fluoridation. His present article which was given as a demonstration before the Annual General meeting of the British Dental Association at Cardiff, June, 1952, is PULP CONSERVATION AND TECHNIQUE.

WILLIAM L. PEECOCK, B.A. (University of Alabama, 1950), D.D.S. (New York University College of Dentistry, 1954) is a general practitioner who has published a number of practical suggestions in our clinical and laboratory suggestion department. His article in the current issue is DANGERS IN COLD STERILIZATION OF NEEDLES.

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The magazine is mailed on the fifteenth of the month of issue.

# PULP CONSERVATION

## and Technique\*

CHARLES DILLON, D.D.S., I.D.S., Inverness-Shire, Scotland

### DIGEST

*Secondary dentine is often described as a natural reaction of the pulp to injury, but it may more accurately be regarded as a fortuitous pathologic occurrence, enabling the uninjured part of the pulp to carry out its physiologic function. In other words, secondary dentine is an example of a pathologic change serving a physiologic purpose. This article enumerates the requirements for successful pulp conservation therapy and presents a step-by-step technique which has been employed by the author.*

### Approaches to the Problem of Pulp Conservation

The idea of pulp conservation is probably as old as dentistry, but the scientific approach to the problem has only recently been developed.

**Calcium Hydroxide Recommended**—Zander<sup>1</sup> recommended the use of calcium hydroxide in 1939. Because calcium hydroxide is unstable in the presence of carbon dioxide, Zander's recommendation actually amounted to the application of calcium carbonate or bicarbonate to the pulp.

**The Role of Calcium Bicarbonate**—Also in 1939, Robison<sup>2</sup> acknowledged the role of calcium bicarbonate in the presence of the enzyme phosphatase in bringing about calcification of richetic bone. In applying calcium

hydroxide and/or calcium carbonate or calcium bicarbonate to the pulp, Zander has successfully achieved secondary densification in the pulp chamber, for the enzyme phosphatase is always present in exposed pulps.

**Combination Successfully Used**—Calcium hydroxide, used by the author,<sup>3</sup> has not proved so consistently successful as an application of calcium phosphate and calcium carbonate which was one of the early combinations used to obtain successful results demonstrated in 1941.

**Hydrolizable Phosphate Salt Recommended**—Although Robison acknowledged the part played by bicarbonates in bringing about calcification of richetic bone, he emphasized the greater importance of using calcium phosphates, and he recommended a readily hydrolizable phosphate salt such as one of the hexose phosphates.

**Case Successfully Treated**—Among the earliest successes by the author<sup>3</sup> was a case treated in 1939 as shown in Figure 1. The tooth in this case was treated with calcium phosphate and calcium carbonate compounded into a thick paste with oil of cloves. This tooth is still vital and in function after 16 years.

### Essential Requirements for Successful Pulp Therapy

There are four essentials in pulp conservation techniques:

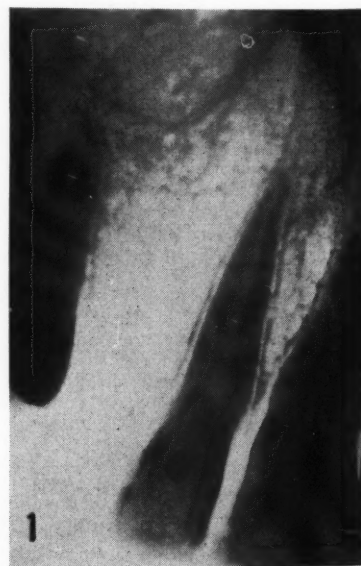
1. To ensure absolute sterility. This should be the aim but experience shows that even with a low grade infection successful pulp therapy is still possible, provided the infecting bacteria are not of a nature to induce rapid dissolution or liquefaction of

tissue before the prosthetic phenomenon of calcification occurs.

2. The contents of the pulp chamber must be treated gently. Amputation of the pulp with an instrument, however sharp, is not recommended. Experience has shown that this measure leads to a dragging and tearing of the pulp contents because nerve tissue is difficult to sever. The result is that infection is likely to spread along the canal apexward beyond the healing effect of any therapeutic measure that may be introduced in the coronal portion of the pulp chamber.

3. The introduction of a readily hydrolizable and soluble calcium salt that is near enough to neutrality to be nonirritating to the pulp.

4. Purity of materials used. The chief impurities to guard against are impurities of lead, arsenic, and fluo-



**1. Upper left lateral (x-ray view) treated in 1939. This tooth is still in vital functioning condition after 16 years.**

\*This material was presented as a demonstration before the Annual General Meeting of the British Dental Association at Cardiff, June, 1952.

<sup>1</sup>Zander, H. A.: J. Dent. Research 27:373, 1939.

<sup>2</sup>Robison, R.: The Significance of Phosphoric Esters in Metabolism, N.Y. University Press, 1932.

<sup>3</sup>Dillon, Charles: British Dent. J. 19:365, 1941. South African Dent. J. (Feb.) 1949, p. 1.



ride. The water used for mixing the paste must be distilled water, not tap water.

**Calcium Glyoxalate as Antibiotic**—To ensure the four essentials the author uses an antibiotic in conjunction with the calcium paste. In the author's technique calcium glyoxalate is used as the antibiotic. Little has been published about this substance but additional information will be presented in a future paper explaining its antibiotic effect and the method of preparing the agent. An alternative is calcium penicillin in dilute solution.

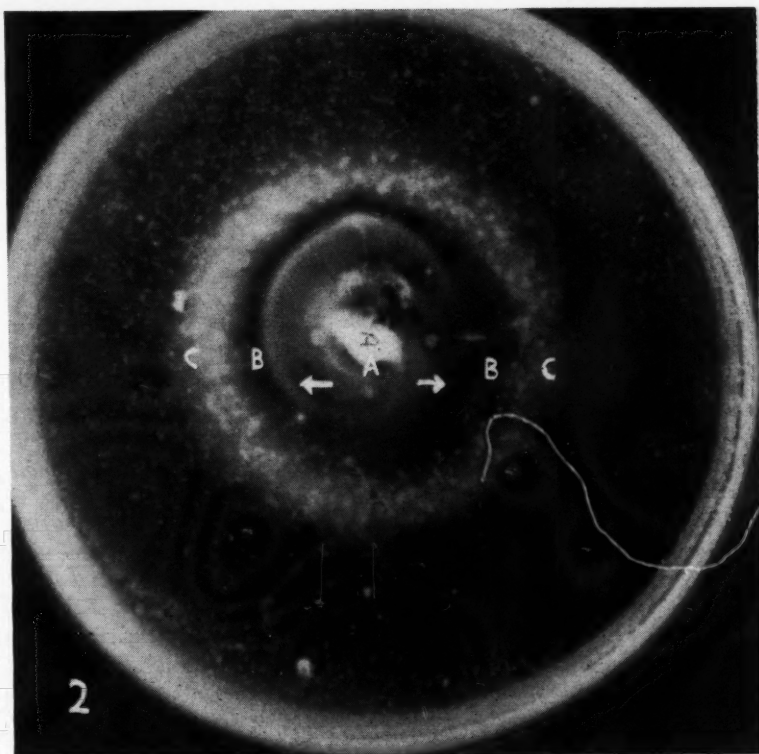
**Cautery Recommended for Amputation of Pulp**—Should amputation of the pulp become necessary the use of cautery is recommended in preference to other methods.

**Calcium Glycerophosphate, Formula**—The calcium salt used is glycerophosphate. This is a readily hydrolyzable salt. It is a white crystalline powder obtainable from any pharmaceutical supply house. It is used in medicine under the trade name of Neutrosin.<sup>®</sup>

**Basic Calcium Phosphate Deposited**—A solution of the salt in water slowly hydrolyzes and deposits a layer of basic calcium phosphate on the sides of the beaker. In the presence of bacteria or the enzyme phosphatase, this calcium salt deposits a layer of basic calcium phosphate almost immediately. This principle is illustrated experimentally in Figure 2.

**Principle Demonstrated**—The following steps were taken:

1. Saliva was taken from a patient whose pulp was to be treated. This was diluted ten times with sterile distilled water and poured over an agar plate.
2. A paste of calcium glycerophosphate compounded with an aqueous solution of calcium glyoxalate was placed upon this.
3. The paste was spread on the agar plate as shown in Figure 2, area A. Area B in Figure 2 shows a ring of inhibition, and since there was no bacterial growth in this area, no basic phosphate was deposited in 24 hours.
4. When the paste diffused out to an area where the glyoxalate no longer had a bacteriostatic effect, however,



2. Phenomenon produced by calcium glyoxalate compounded with calcium glycerophosphate.

at once a layer of basic phosphate was deposited, as shown in the cloudy area, C.

### Preferred Method

Calcium penicillin, compounded with calcium glycerophosphate, will produce the same type of phenomenon demonstrated in Figure 2, but glyoxalate is still preferred by the author as the method of maintaining sterility for a sufficiently long time to ensure preliminary calcification without which true densification will not occur.

**Inhibition of Bacteria**—If the paste is placed over an exposed pulp where there is some residual infection, the moment the paste encounters an area or pocket of bacteria, total inhibition of the viable microbes present may occur. In any case, when the paste encounters the by-products of bacterial growth there is an immediate deposit of a prosthetic layer of basic calcium phosphate.

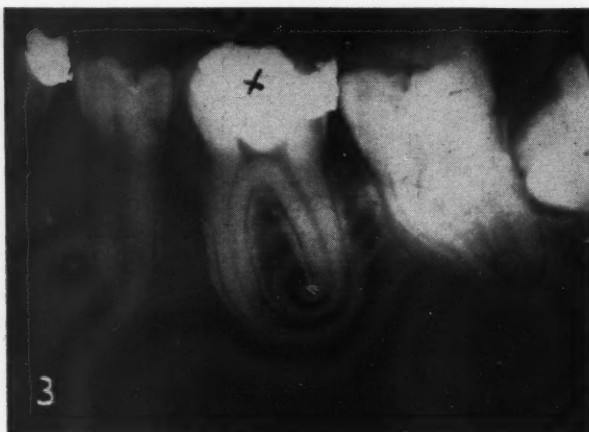
**Calcification May Occur**—Later this may result in a calcification of the

partly degenerated cells immediately below it. This, in turn, is followed by a densification just below the area of calcification, when the proliferation of vital elements invades the calcified area and converts it into the architectural design (not always perfect) typical of true secondary dentine formation. The exposed, or exposed and infected, area is thus walled off from the rest of the pulp chamber.

**Illustration of Case Treated**—Figure 3 illustrates the first case treated with a paste of calcium glycerophosphate compounded with calcium glyoxalate. This case was completed in October 1940. The x-ray illustration in Figure 3 represents a tooth in a vital functioning condition, with unbroken lamina dura, after 15 years of service.

### Specific Technique Employed

The steps included in the technique now employed and an illustration of the result to be expected are the following:



**3.** Lower left six-year molar treated in October 1940. Note unbroken lamina dura after 15 years of service.

1. The rubber dam is applied wherever possible. When an exposure is inevitable, use of the rubber dam is imperative. If accidental exposure should occur, apply the rubber dam and follow the technique described.

2. Isolate the teeth from the saliva. Use the bur to cut round the cavity, exposing as large an area of dentine as possible in order to accommodate the overlying dressings and to secure adequate retention of these dressings.

3. After the preparation has been carried deep to the pulp, a suitable site is chosen to facilitate diffusion of the paste through the dental tubules. With a sharp instrument the overlying dentine is flaked off.

4. When the pulp is exposed (the actual exposure should be kept as

small as possible) apply a suitably shaped cautery at a bright heat over the area, touching it intermittently, and taking care not to overheat the tooth. A sleeve of asbestos molded over the cautery helps in this case. The charred mass remaining should not be removed, but the paste should be applied directly over the mass.

5. Compound on a slab a paste of calcium glycerophosphate with the antibiotic of choice as follows:

(1) Place a small knife point of calcium glycerophosphate on a clean slab.

(2) Place a drop of 0.5 solution of calcium penicillin on this, making a thin fluid paste.

(3) It is advisable to use the calcium salt of the antibiotic chosen. A

sodium salt tends to retard calcification.

(4) A thick paste was formerly used for application, but experience has shown that a thin mix is more desirable, for it is easier to handle and apply.

**Application of Dressing**—A small pledget of sterile cotton (autoclaved) is saturated with the thin paste and applied to the exposed area. Dab and seat by means of another pledget of cotton (do not dry) held in the forceps. A layer of thin gutta-percha is applied to cover this in the following manner:

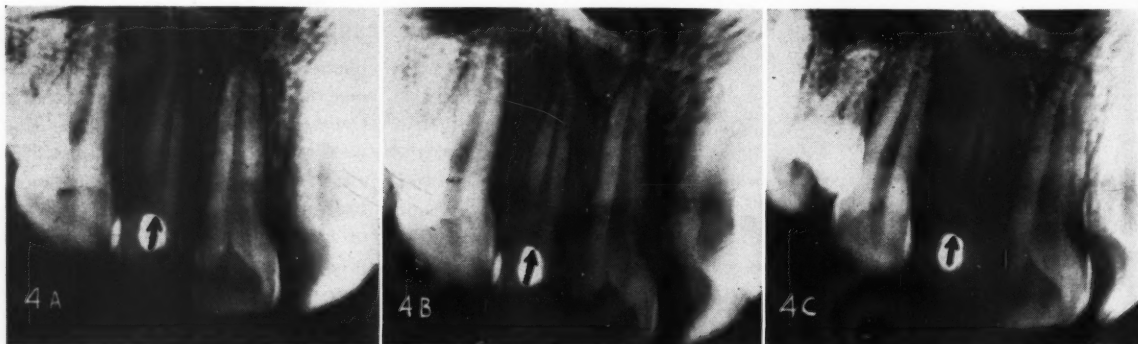
1. Soften a small amount of gutta-percha, flatten it to a thin layer between two plates of thick glass.

2. Pick the gutta-percha up with an amalgam plugger that has been specially sharpened at the edges, or cut off a small piece with a sharp knife and apply it with a probe to cover the thin pledget of cotton impregnated with the calcium salt and antibiotic dressing. To keep the gutta-percha in a workable consistency, warm the glass plate on which it is kept.

3. The gutta-percha is placed over the cotton dressing and pressed down gently with a smooth instrument. The dressings should be kept clear of the mesial, distal, or gingival margins of the cavity.

**Insertion of Zinc Oxyphosphate Cement**—1. Insert a stiff mix of zinc oxyphosphate cement which is usually free of fluorine.

2. Roll the mix into a round ball between the fingers, insert it in the



**4A.** Note cloudy area occupied by paste.

**4B.** Note forming bridges of secondary dentine and clearing of the area previously cloudy.

**4C.** Note true secondary dentine formation established in the walls of the original dentine and further clearing of cloudy zone shown in Figure 4A.

cavity over the gutta-percha.

3. Seal the mix in place with a blunt and polished instrument, taking care that the dressings are thoroughly enclosed and that the cement is condensed firmly against the walls of the cavity.

**Placing a Permanent Restoration—**The insertion of the permanent restoration, whether silicate or amalgam, may be carried out at once or delayed according to the discretion of the operator.

### Results and Additional Factors in Management

**Analysis of Figure 4—**The stages of progressive densification and sealing off of the coronal pulp from the radicular portion are illustrated in Figure 4, (A), (B), (C). The success of the procedure described is demonstrated in this illustration.

**Figure 4A—**This is an x-ray of the upper left lateral taken 24 hours after treatment. Note the cloudy precipitate below the restoration.

**Figure 4B—**Taken five weeks after the x-ray shown in Figure 4A, this

shows the formation of a bridge of calcification and/or a certain amount of densification.

**Figure 4C —** Three months after treatment the bridge of secondary dentine is well established in the original dentine.

**Cloudy Deposit Cleared —**Note in Figures 4B and 4C the clearing away of the calcium phosphate seen in Figure A immediately below the restoration. In Figure C further clearing can be easily distinguished, which shows that the calcium deposit first formed is being used up and converted into true secondary dentine formation.

**Factors in Management—**If an anterior tooth is being treated and the cavity is such that an approach from the mesial or distal could not be successfully completed without weakening the tooth, an approach should be made at the lingual in the same manner as for root canal treatment. The pulp is then conveniently exposed below the mesial or distal cavity.

**Pulp Treated Before Restoration—**It is important that the pulp be treated before the restoration on the mesial

or distal is inserted, for if the restoration on the mesial or distal were inserted first, in approaching the pulp from the lingual side, the silicate might be encroached upon. The dust from the silicate restoration, which may contain 16 per cent fluorine, might in this way contaminate the pulp which would result in its inevitable death.

**Problem in Class II Restoration—**In a Class II restoration which extends below the level of the gingival tissues and which might cause difficulties with the rubber dam, or with the insertion of the dressings against a sloping surface, close the Class II cavity with gutta-percha. The pulp is then approached from a convenient site (perhaps on the buccal). The cavity is extended to the pulp chamber, exposing the pulp below the level of caries. After dressing the pulp through this cavity the Class II restoration may be completed.

*Caladh, Fort William  
Inverness-Shire, Scotland*

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## Diet and Life Span

APPARENTLY somewhere between the extremes of under-nourishment and dietary enrichments lie those regimens that are optimal for longevity. Ideally, these should permit a good and uniform but not necessarily fast rate of growth and development early in life, and should, in order to avoid the injurious effects of overnutrition, subsequently stay at a low level that

should still be adequate to permit a person to live not only a long but, at the same time, an active and useful life. Retardation of growth as such does not seem to contribute materially to longevity just as acceleration of growth as such does not appear to contribute materially to the shortening of the life span. On the other hand there are indications that the duration of life is in-

fluenced more by conditions to which the effect on growth is incidental and which prevail also when growth has passed its most active phase. This agrees with the concept that growth and longevity are not mutually interdependent but are coordinated phenomena governed by the same metabolic principles.

From Medical Literature Abstracts, *Journal of the American Medical Association* 158:1403 (August 13) 1955.

# **Dangers in COLD STERILIZATION of Needles**

WILLIAM L. PEECOCK, D.D.S., Hartsdale, New York

## **DIGEST**

*This article describes a simple procedure for sterilizing anesthetic needles when it is desired to use cold sterilization rather than to autoclave or boil the needles to ensure sterilization.*

### **Sterilization Method Commonly Used**

One of the more common practices in dentistry is the cold sterilization of syringe needles. This is attempted (A) by suspending the assembled syringe in a jar of sterilizing solution, or (B) by storing the needles of the screw-on type separately in the solution. In the latter case the needles are reattached to the syringe just prior to injection.

*Methods Inadequate*—These methods of sterilizing needles are fundamentally dangerous. The outside of the needle, provided it is adequately cleaned with soap and water before being placed in the solution, may be sterilized but the lumen of the needle cannot be treated with certainty by the solution even if the solution is allowed to diffuse into the lumen many hours.

*Assumption Unsound*—Presumably the lumen of the needle bears only sterile local anesthetic from the previous injection. It is assumed that this material need only be flushed out with a few drops from the new anesthetic cartridge before the next injection.

This is fallacious reasoning.

*Tissue Fluid Drawn into Needle*—Actually, the rubber plug that the piston of the syringe pushes through the cartridge in discharging the anesthetic is compressed during the injection. When pressure on the piston is released the rubber plug contracts slightly and draws tissue fluids of the patient into the needle. These fluids are injected into the next patient. The significance of this should be considered.

*Suction Demonstrated*—Proof of the fact that considerable suction is effected is seen by injecting anesthetic

solution into a bottle of ink. When pressure is released on the piston, some ink will be seen entering the cartridge through the needle (Fig. 1).<sup>1</sup>

### **Method to Ensure Sterilization**

For proper sterilization needles should be autoclaved or boiled. If it is desired to use cold sterilization, use of the following method will afford better results than those commonly used.

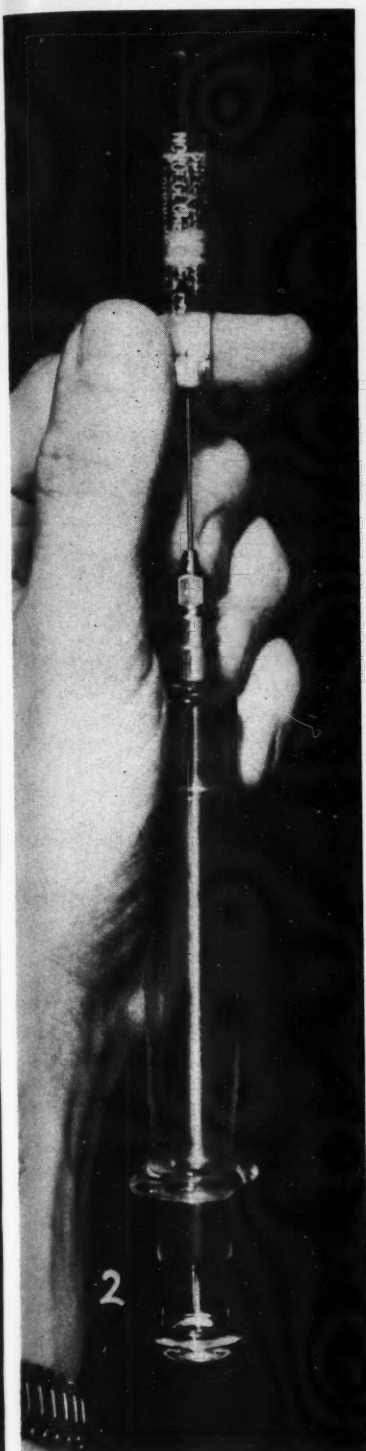
*Procedure*—(1) Using a 5-cubic centimeter or 10-cubic centimeter medical syringe with a large (19-

<sup>1</sup>Nevin, Mandel: Problems in Dental Local Anesthesia, New York, Dent. Items Interest Pub. Co., 1952, p. 69.



1. Showing ink being drawn into cartridge when thumb pressure is released.





2. Method of filling used anesthetic cartridge with sterilizing solution.



3. Method of identifying special cartridges by banding.

gauge) needle, fill several empty anesthetic cartridges with sterilizing solution.

(2) This is easily done by filling the syringe and forcing the needle through the stationary metal or rubber end of the cartridge.

(3) Inject the solution, forcing the movable rubber plug back to its original position in the full cartridge (Fig. 2).

(4) The solution should be withdrawn and discarded as a rinse. The cartridge is then filled for actual use.

(5) The specially prepared cartridges should be banded with red scotch brand tape or nail polish and stored in a different place from the regular stock of local anesthetic (Fig. 3).

*Additional Measures*—Before a syringe is placed back in sterilization after use it should be washed with soap and water, rinsed thoroughly, and should have several drops of sterilizing solution flushed through the needle. The latter is accomplished by loading the syringe in the usual manner with one of the special cartridges and discharging about one-third of the solution. This procedure brings the full concentration of the sterilizing solution in contact with the inner surface of the flushed needle.

### Conclusion

By preparing several cartridges in advance, a quantity of needles can be flushed with no delay.

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# CUTTING PROPERTIES

## of Dental Burs: Report

NATIONAL BUREAU  
OF STANDARDS

U.S. Department of Commerce  
Washington, D.C.

### DIGEST

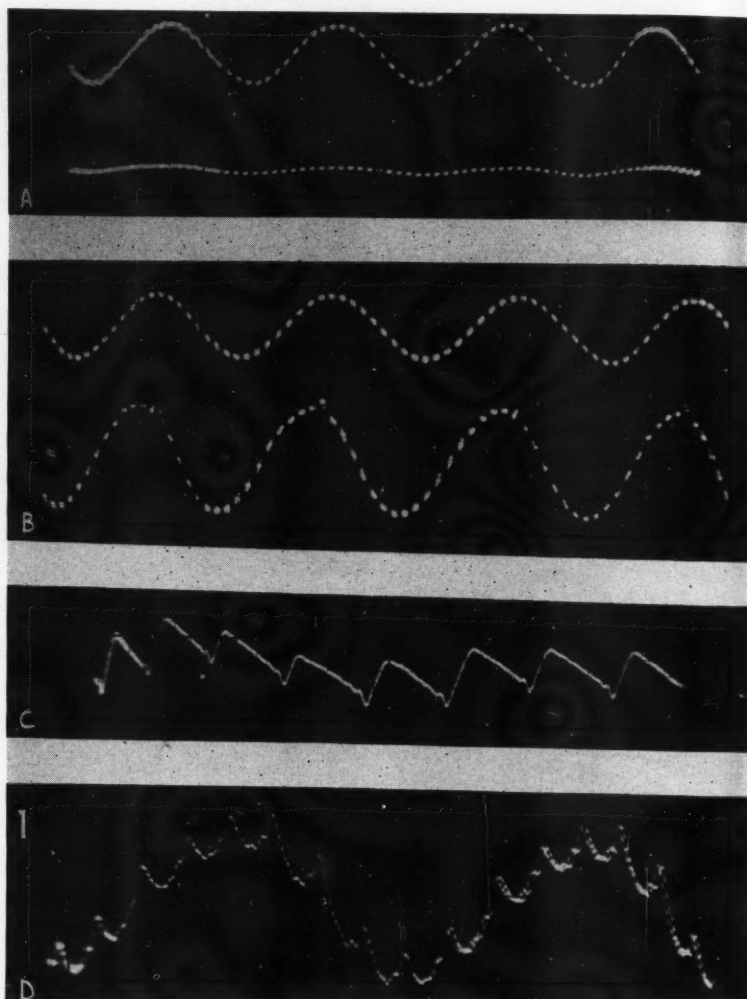
*Research at the National Bureau of Standards dental research laboratory indicates that eccentricity of rotating burs causes vibration at frequencies distressing to dental patients. This information was obtained in a study<sup>1</sup> recently completed by guest workers from the U.S. Air Force Dental Service and members of the Bureau of Standards staff. It was also found in this investigation (1) that high-speed rotations of true-running dental instruments produce vibrations above the frequencies causing the greatest distress, and (2) that burs and diamond wheels cut more effectively at higher speeds. This report describes the method of investigation used and presents the results.*

### Effect of Dental Burs Studied

Until a few years ago little was known regarding the cutting action of dental burs on human teeth. Data on industrial cutters are not entirely applicable to dental instruments because the properties of tooth enamel and dentin differ from other materials and because dental instruments are so much smaller than industrial cutters. The problem is also complicated by the subjective element introduced by the patient.

*Primary Aim of Investigation*—The primary aim of the National Bureau of Standards study in this field has

<sup>1</sup>Hudson, Donald C.; Hartley, Jack L.; Moore, Robert; and Sweeney, William T.: Factors Influencing the Cutting Characteristics of Rotating Dental Instruments, JADA 50:377, 1955.



**1. Photographs of wave traces used to study vibration produced by dental instruments at the National Bureau of Standards dental research laboratory. A. The upper trace was produced by a standard frequency oscillator at 166 cycles per second; the lower trace by a diamond instrument 0.001-inch eccentric rotating at 10,000 rpm. Note low amplitude of 166-cycle component produced at this speed. B. Upper trace shows standard 166-cycle wave form; lower trace is large-amplitude, 166-cycle wave produced by a 0.007-inch eccentric diamond instrument, rotating at 10,000 rpm. C. Trace was produced by an eight-bladed steel bur, 0.001-inch eccentric, rotating at 10,000 rpm. The vibration frequency is about 1,300 cycles per second. This is well above the frequency disturbing to most dental patients, and the low-frequency component is of extremely low amplitude. D. Trace shows the wave form produced by an eight-bladed steel bur 0.007-inch eccentric rotating at 10,000 rpm. The low-frequency component, 166 cycles per second, is within the disturbing range and is of considerable amplitude.**

been to discover how the rotating dental instrument may be most effectively operated without injuring vital structures through high temperatures<sup>2</sup> or vibration and with minimum discomfort to the patient.

**Secondary Aim**—A second aim has been to gather data for use by the armed services in specifying standards for procurement of rotating dental instruments.

**Cause of Vibrations in Distressing Range Investigated**—Previous study in other laboratories has shown that vibrations applied to teeth in the frequency range between 100 and 300 cycles per second produce the most unfavorable patient response.<sup>3</sup> Unfortunately, frequencies in the range 100 to 200 cps are dominant in eccentric burs rotated at 6,000 to 10,000 rpm, speeds now used by many practitioners. The National Bureau of Standards investigation attempted to determine what degrees of bur eccentricity at what speeds cause vibrations in the distressing range.

### Methods of Study

A number of steel and carbide burs and diamond abrasive wheels from various sources were studied in the following manner:

1. The abrasive wheel or bur under investigation was mounted and rotated in a draw collet chuck.
2. A hard steel vane was held between the rotating instrument and a mutual-inductance transducer,<sup>4</sup> energized by slow-powered rotating frequency generator.
3. The micrometer pickup reacted to minute movements of the vane as it was made to shift by irregularities in the rotating instrument.
4. Output of the vibration pickup was placed on an oscilloscope screen for photographing and study.
5. The rotating chuck was precision-machined so that any displacement of the steel vane was caused by the eccentricity or surface irregularity of the dental bur.

6. The pickup was mounted on a small carriage that rolled on machined tracks.

7. Weights, attached to cords hanging from the carriage, held the mutual inductance transducer in proximity to the vibrating vane.

### Results Obtained

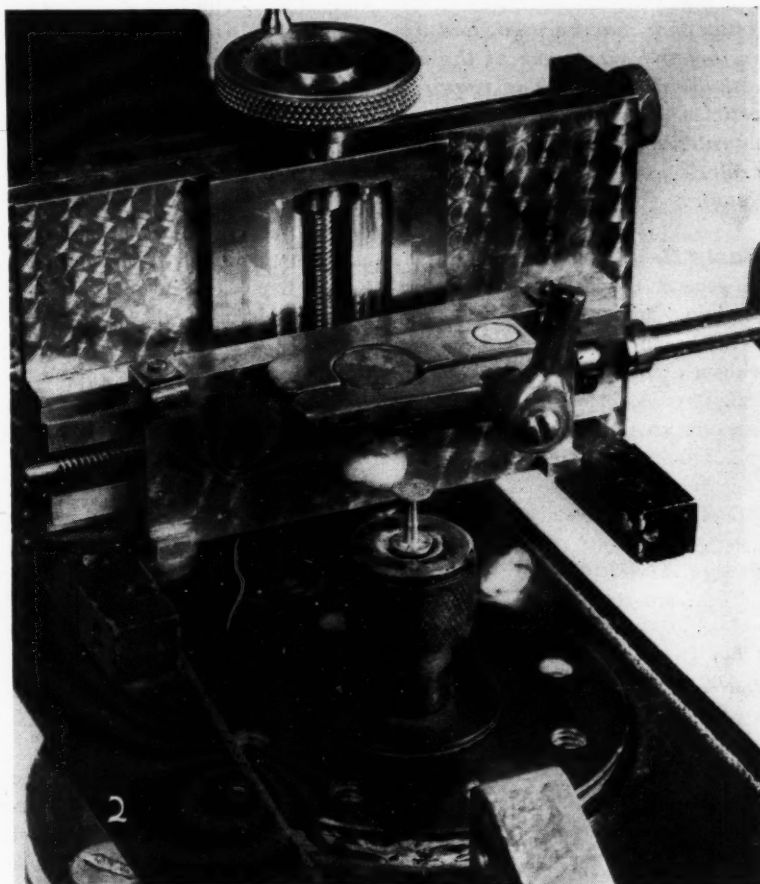
**Frequencies Noted**—It was found that a true-running eight-bladed bur rotating at 10,000 rpm produced eight low-amplitude peaks per revolution at a frequency of 1,330 cps. A similar but eccentric bur, however, rotating at the same speed produces a fundamental frequency of 166 cps with amplitude proportional to the amount of eccentricity.

**Discomfort Reduced**—The infor-

mation regarding vibration will be applied to clinical practice as rotating instruments are improved. If eccentricity of dental burs is kept small and symmetry of cutting heads increased, the chatter and vibration in the range of frequencies most annoying to patients can be reduced.

**Effect of Handpiece on Vibration**—Even the most accurate bur will not perform properly in a handpiece that does not operate smoothly. The Bureau plans to study the effect of the handpiece on vibration in the near future.

**Relative Cutting Ability Compared**—In the course of the study on rotating dental instruments, the relative cutting ability of steel and carbide (Continued on page 121)



**2. Apparatus used to study the cutting efficiency of dental instruments at the National Bureau of Standards dental research laboratory. A diamond instrument is shown held in the collet chuck (center). An extracted tooth is held by a jig mounted on the roller carriage. Steel, carbide, and diamond instruments were rotated at speeds from 5,000 to 10,000 rpm. Results show that carbide burs cut dentin twice as fast as steel, but diamond instruments cut the hard enamel of teeth much more efficiently than either bur.**

<sup>2</sup>Hudson, Donald C., and Sweeney, William T.: Temperature Developed in Rotating Dental Instruments, *JADA* 48:127, 1954.

<sup>3</sup>Walsh, J. P., and Symmons, H. F.: Vibration Perception and Frequencies, New Zealand D. J. 45:106, 1949.

<sup>4</sup>An earlier NBS development. See Technical Details of an Electronic Micrometer, *Electronics* 20:11 (Nov.) 1947; also Design Criteria for Mutual Inductance Transducers, NBS Technical News Bulletin 39 (March) 1955.



# GENERAL ANESTHESIA

## for the Dental Practitioner—Part One

HAROLD L. HAMBURG, B.S., D.D.S., Brooklyn, New York

### DIGEST

*In this, the first of his two-part illustrated article on general anesthesia in the dental office, the author discusses the various forms of administration of anesthetic, the pharmacology of the drugs that may be used, and describes the symptoms of the anesthetized patient. The required articles of equipment are enumerated and the duties of the operator's assistant are outlined in detail.*

### Basic Requirements

In general anesthesia the following conditions are essential:

1. The quick production of narcosis without excitement.
2. Physiologic maintenance for satisfactory lengths of time.
3. Elimination of the effects of narcosis in a suitable time to permit the patient to leave the office.

### Drugs Available for Use

These are classified in four categories:

- (1) Drugs for inhalation administration.
- (2) Those for intravenous administration.
- (3) Those for oral administration.
- (4) Those for rectal administration.

**Oral Administration**—Although oral drugs are widely used they cannot be used successfully as a routine method of anesthesia.

**Variation in Effects:** Three patients of the same height, weight, and temperament, given the same amount of sedative may react in completely different ways. The first may become

sleepy in two hours and retain the effects for one hour, the second may become toxic in one hour and retain the effect for the whole day, while the other may show no effect at all.

**Effects Unpredictable:** It is impossible to predict the time or intensity of oral dosage. Oral administration is therefore of value only when time and duration are of little importance.

**Venous Administration**—It is rapid and controlled but recovery is delayed. This is by far the most pleasant method of induction and recovery for the patient. Administration is relatively easy but requires an accessible vein, consent to puncture, and the exclusive attention of the anesthetist or his assistant.

**Rectal Administration**—This method is not a practical one in the dental office.

**Inhalation**—In theory, inhalation is the route of administration of choice. The agent is readily absorbed into the blood stream by this method, and passes to the brain centers in 12 to 15 seconds (the time required for the passage of the blood from the lungs to the brain).

**Maintenance:** Anesthesia can be maintained as long as desired and the patient brought back to full consciousness within seconds.

**Safety Factor:** Inhalation technique has the greatest therapeutic safety factor since the dosage, unlike oral and parenteral methods, can be reduced in 12 to 15 seconds at will.

**Detractive Factors:** The inhalation drugs which are available, however, have certain qualities that detract from their usefulness, for example, prolonged excitement and post-treatment nausea.

### Pharmacology of Anesthetic Drugs

Before selecting the method of administration the pharmacology of the anesthetic drugs should be surveyed and special attention given to the ideal anesthetic qualities of each.

**Nitrous Oxide**—With the use of this agent the following conditions are observed:

1. Narcosis is produced slowly with much excitement and in many cases incompletely.
2. Physiologic anesthesia cannot be maintained. Anoxia is a necessary adjunct.
3. Recovery is rapid with nausea not uncommon.

Nitrous oxide is pleasant in odor and taste and nonexplosive. It must be administered by means of a machine.

**Trichloroethylene**—The odor and taste are unpleasant. Fibrillation has been reported in extended use of this agent. The agent must also be vaporized in a machine. It is nonexplosive. In use trichloroethylene possesses the following characteristics:

1. Narcosis is produced more rapidly than with nitrous oxide but it is attended by an excitement stage.
2. Physiologic anesthesia can be maintained.
3. Recovery is rapid with occasional nausea.

**Vinethene®**—Odor and taste are moderately agreeable. Liver damage has been reported with extended use. The agent can be used in a machine or by open drop method. It is inflammable. It has the following characteristics:

1. Narcosis is produced faster than with nitrous oxide but is also attended by an excitement stage.
2. Physiologic anesthesia can be maintained.



3. Recovery is rapid with some nausea.

**Ethyl Chloride**—This agent is pleasant in taste and odor. Liver damage is reported in extended use. It is highly explosive in a closed system. It can be used in open drop administration. In use the following characteristics are noted:

1. Induction of narcosis is rapid with little excitement.

2. Physiologic anesthesia can be maintained.

**Gases with Limited Use**—Ether and chloroform have a slow recovery, and are certainly not suited to an ambulatory practice. Ethylene and cyclopropane are too explosive and are therefore precarious to handle.

**Sodium Pentothal®**—In using this agent the following factors are present:

1. Induction is rapid with no excitement.

2. Physiologic anesthesia can be maintained.

3. Recovery is delayed but is attended for all intensive purposes without nausea.

**Combination of Agents Desirable**—There is a negligible difference in the characteristics of pentothal®, evipal®, surital®, or any of the extremely short acting barbiturates.

It would appear that ideal anesthesia can be obtained, not with any one inhalation drug, nor with any one intravenous drug, but rather with a combination of these compatible drugs.

### Anesthesia—Description

By definition anesthesia is a loss of consciousness with a loss of pain induced by depressant drugs under the control of the administrator. The anesthetic state differs from sleep in that in the latter unconsciousness is induced and controlled by the subject. It differs from shock, coma, and death in that its duration is controlled by the anesthetist. There are certain definite signs which enable the anesthetist to determine and regulate the state of anesthesia.

**Signs of Anesthesia**—These are visible physiologic alterations of the body to depressant drugs. All drugs administered for systemic use have varying

signs. These are usually studied as the side reactions of the drug. They are known to exist but are not a cause for alarm.

**Circulatory and Respiratory Changes**—In addition to progressive muscular relaxation there are visible circulatory and respiratory changes. The operator must be able to recognize these changes in order to maintain a smooth narcosis.

### Stages in Anesthesia

Anesthesia is commonly classified in four stages:

1. Analgesia
2. Excitement stage
3. Surgical stage
4. Paralysis

**Analgesic State**—Progressive paralysis of the central nervous system accounts for the physical reactions at varying saturations of depressant drugs. At the beginning of the administration, the higher cortical centers are affected. The patient loses perfect speech control, begins to perspire and experience minor pain sensations. He has full muscular control but is susceptible to semihypnotic suggestion. He can voluntarily hold his breath, breathe faster or slower. He is awake and much like a man who is slightly intoxicated.

**The Excitement Stage**—As anesthesia progresses, the higher centers are completely deadened and the patient enters the excitement stage. The pulse is rapid and uneven and muscle reflexes are active. The excitement stage has no value and should be shortened as much as possible.

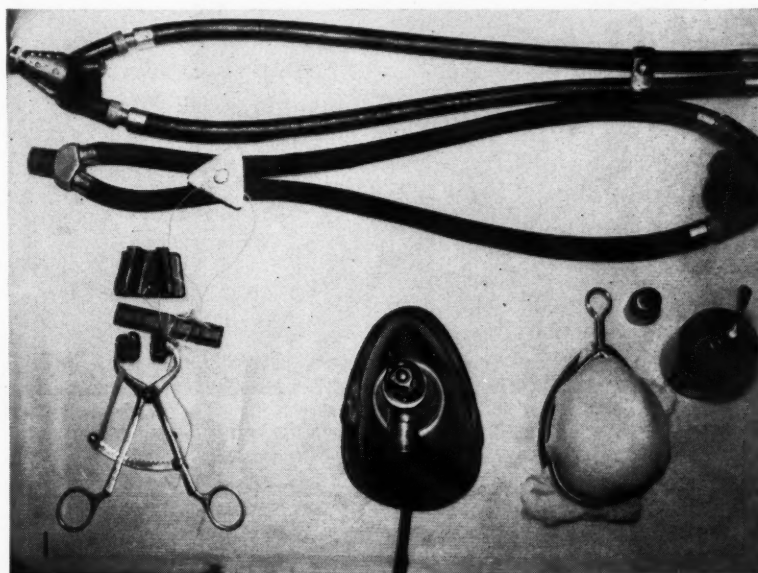
**The Surgical Stage**—As the anesthetic begins to control breathing, the breathing becomes mechanical, inspiration and expiration are equal in degree and at a rate of sixteen breaths per minute. There is complete loss of consciousness, sight, sound, touch sensation, and awareness. Muscular paralysis begins. First the eyelid and eye muscles, then the thoracic and pupillary muscles in the late plane of this stage become paralyzed.

**Paralysis Stage**—The fourth stage or complete respiratory depression is never seen in dental anesthesia when it is properly administered. The aim in dental general anesthesia is lightness of narcosis, not depth.

**First Plane of Surgical Stage**—This phase in anesthesia is that best adapted to dental operations. It is characterized by the following conditions:

(1) Breathing is mechanical.

(2) The eyelid reflex is absent and in the lightly or unpremedicated pa-



1. Accessory instrumentation: child size and adult size nasal inhalers, McKesson mouth prop, De Pass mouth prop, Molt mouth prop, full face inhaler, open drop mask, Vinethene,® ethyl chloride.



**2.** Full face mask in use. Gentle pressure is applied to secure complete seal while the chin is supported.



**3.** Nasal inhaler and mouth cover in use. Again the seal is maintained while the chin is supported.

tient the pupil of the eye is normal.

(3) The jaws are *not* relaxed necessarily and in most cases exhibit a certain amount of tension when opened.

(4) The limbs are relaxed although

they may exhibit occasional movement.

(5) In most cases the adult is silent having passed from the vocal excitement stage. The child, however, if an-

esthesia is induced when he is crying, may continue to cry well into the second or third plane. Sounds are not an indication of anesthetic level.

(6) The pulse is normal.

(7) The chief and only reliable sign is breathing. The signs exhibited by the eyes, circulatory system, and musculature are substantiating symptoms.

**Depth in Anesthesia**—Prolonged expiration with a gasping inspiration is indicative of depth. Breathing is diaphragmatic rather than thoracic. The eye is fixed and widely dilated.

**Evidence of Improper Technique**—Cyanosis, and muscle jactitation formerly termed signs of depth, are actually signs of imperfect administration and inadequate airway.

**Comment**—Although the symptoms of sleep in a child are reassuring, the same symptoms in the anesthetized patient seem to cause alarm. This contradiction must be overcome by the dentist who should assure himself that the breathing and appearance which maintains the child safely until he awakens will also sustain the anesthetized patient without injury until he awakens.

**Comparative Symptoms**—The symptoms of a child deep in sleep and those of complete anesthesia at the level for dental treatment may be compared in the following manner:

#### Sleep

1. Deep mechanical breathing
2. Occasional reflex movements
3. Little eyelid activity
4. Body limpness

#### Anesthesia

1. Deep mechanical breathing
2. Occasional reflex movements
3. No eyelid activity
4. Body limpness

The experienced operator will accept the signs of anesthesia, not as warnings of danger, but as the condition of the patient in the anesthetized state.

### Equipment Required

**The Gas Machine**—Any commercially made gas anesthetic machine that allows the administration of nitrous oxide and oxygen may be utilized. A vaporizer for vinethene or trichlorethylene should be attached.

The following controls are necessary:

(a) Proportion of nitrous oxide to oxygen

(b) Pressure of gases

**Recommended Machines**—All of the following machines will serve satisfactorily:

1. McKesson Nargraf
2. Heidbrink
3. Gwathmey
4. Foreggor
5. Teter

**Necessary Accessories**—All the accessories to the gas machine that are described here are the minimum necessities to successful anesthesia.

**Masks**—There are two basic types of masks, one for open drop, one for the administration of gas.

(1) **Open Drop Masks**: The only requirement for this mask is that it must keep the gauze that surrounds it from touching the skin. It usually consists of a metal rim with a wire mesh dome. A small circular mask is used for nasal administration and a larger elliptical one is used to cover both the mouth and nose.

(2) **Gas Masks**: All gas masks have in common an adaptable rim which seals the mask to the face and a controlled exhaling valve. The latter closes on inspiration and allows free expiration to the air. The valve, either the McKesson or Connell type, has a tension-regulating mechanism. It is sometimes advisable to apply resistance equal to the pressure of the incoming gases. Otherwise the force in a resistant breather will hold the valve open continuously.

(a) **Full Face Mask**: In the dental office the full face mask is used to apply induction on the resistant child. It is easier to handle and makes the gas accessible to both the mouth or nose. It is necessary to switch to another mask when operating in the mouth.

(b) **Nosepiece and Mouth Cover**: The nasal inhaler fits closely over the nose and by proper adjustment of nosepiece tubes it will remain in place without support. The mouth cover has a valve which allows gases to enter (not leave). The nosepiece has a standard exhaling valve. The valve on the mouth cover has little effect on the anesthesia and is best left closed.

**Mouth Props**—There are two types of mouth props which are generally used: (1) A wedge which is placed between the teeth, and (2) a mechanical prop which levers the mouth open.

**The Wedge**—Advantages of the wedge are the following:

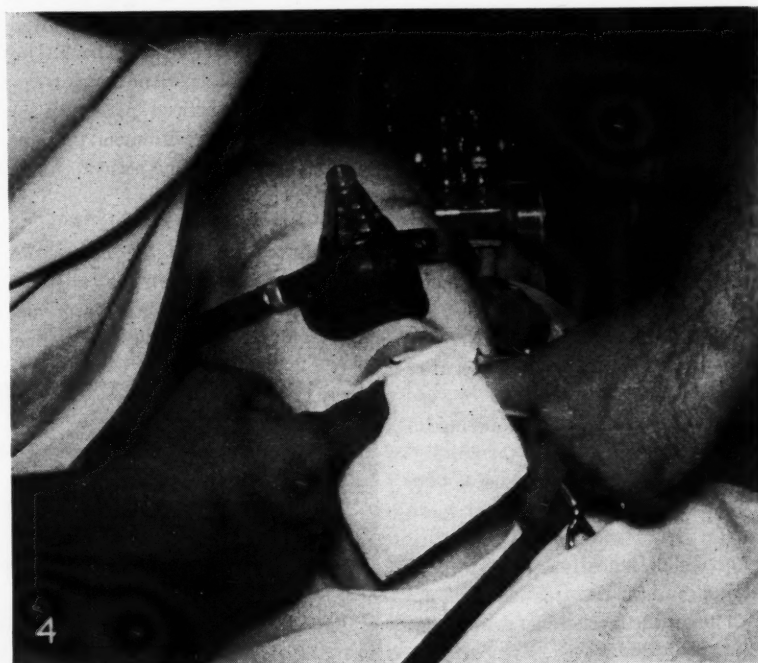
1. There are no mechanical parts to wear.

2. The wedge is completely internal and allows complete mouth coverage during induction.

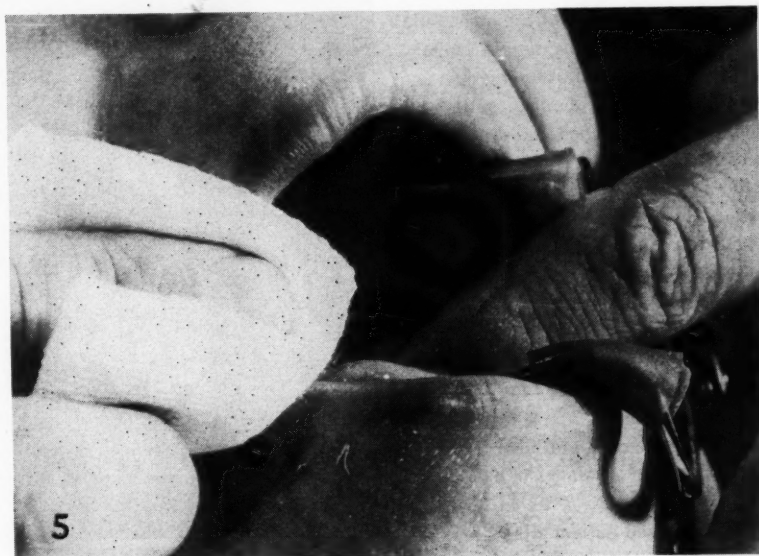
3. The appliance is inexpensive.

**Disadvantages**: 1. Many patients object to the stretched position of the mouth.

2. Wedges are only manufactured in two or three sizes.



4. Packing of throat. The nasal inhaler is self-supporting around the head.



5. Close-up. Note that the forefinger of the left hand has pulled the tongue forward and holds it so that packing can be placed behind tongue.



3. Being internal, the wedge occupies part of the limited oral space.

4. The wedge cannot be used in edentulous patients.

**Particular Indication:** When full mouth coverage is required, the wedge is indicated for mouth breathers.

**The Mechanical Prop—Advantages** of the mechanical prop are the following:

1. The ability to vary size provides greater mouth opening at the level of anesthesia.

2. The patient's mouth is closed during induction.

3. There is a minimum amount of apparatus in the mouth.

4. The appliance can be readily switched from left to right.

5. The prop can be used in edentulous patients.

**Disadvantages:** 1. There is the possibility of mechanical breakdown after continued use.

2. Mouth leak may occur during induction.

3. The appliance is expensive.

4. The props may dislodge loose teeth.

**Particular Indication:** In edentulous patients and in the treatment of the third molar the mechanical prop is definitely indicated.

**Throat Pack—**One of the most important factors in good anesthesia is adequate packing of the mouth. This will prevent an upset of the anesthetic balance by preventing mouth breathing. Protection is afforded against entrance of foreign bodies, pus, and blood into the trachea and esophagus.

**Size:** The throat pack should be large enough to seal off the posterior part of the mouth and small enough not to impinge on the soft palate and cut off the nasopharynx as well as occupy a minimum of the oral cavity.

**Types Available:** Prefabricated throat packs can be purchased, or if the operator prefers he can make his own by cutting six-inch strips from a four-inch gauze roll and piercing with dental floss for a handle.

**A Mouth Force—**A wedge to open the anesthetized patient's jaws may be useful but is seldom necessary.

**Mechanical Aspirator—**To prevent blood and mucus from seeping past the

throat pack and to keep the throat dry a mechanical aspirator is essential.

**Restraining Straps—**Regular straps should be fitted to the chair.

**Pharyngeal Airway—**Orotracheal airways and nasotracheal airways must be provided.

**Lighting—**Satisfactory lighting is an essential in all treatment. Dental anesthesia requires a light that has great versatility and that can be moved up and down, forward and back. Unlike the conscious patient under treatment, the anesthetized patient is in more or less fixed position and the light must be directed on the patient.

### **Role of the Assistant**

The most essential adjunct to the operator in anesthesia is the assistant. An able assistant must perform her duties with mechanical efficiency. In a

one-girl office the assistant's role is important before treatment, during treatment, and after treatment.

**Duties of Assistant Before Treatment—**1. Check tank and vaporizer.

2. Check the operating condition of the gas machine and other equipment.

3. Check the sterilized instruments.

4. Set up handpieces, glass slabs, amalgam, and other necessities.

5. Set up throat packs, bite-blocks, and materials to be used.

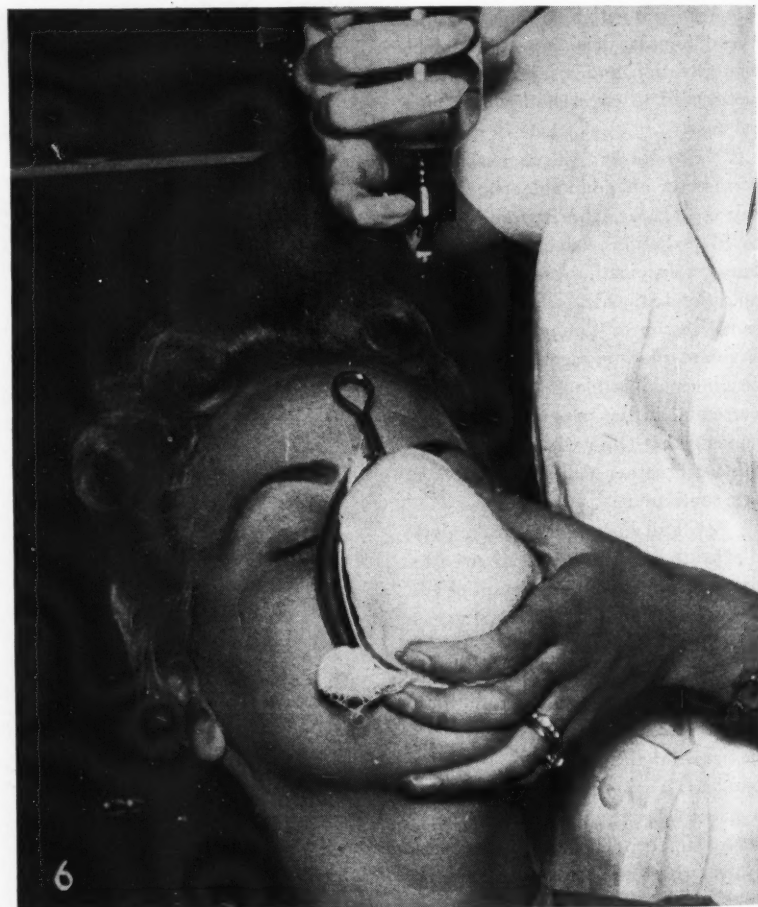
6. Have the patient's record ready for the operator.

**Duties During Treatment—**1. Inquire of patient or parent whether pre-operative instructions were followed.

2. Seat the patient properly.

3. Keep the patient occupied with small talk while the operator is making preparations.

4. Place nosepiece on the patient



**6. Open drop anesthesia.** The mask is held over the nose and mouth during induction while the chin is supported. The eyes are intentionally left uncovered since the volatile liquids are irritating to the conjunctiva.



while the operator inserts the bite-block.

5. Put the mouth cover in position.
6. Adjust the machine at operator's direction.
7. Support the patient's chin.
8. Retract, aspirate, and use air spray.
9. Adjust the light.

10. Turn off vaporizer and administer 100 per cent oxygen at completion of treatment.

11. Remove all disorder before the patient awakens fully.

12. Remain with the patient until he is fully recovered.

*Duties After Treatment*—1. Make the patient comfortable.

2. Hold the emesis basin in position and the patient's head forward if retching occurs.

3. Give the patient postoperative instructions.

4. Dismiss the patient.

5. Return to the operating room to prepare for the next patient.

End of Part One

332A Ninth Street

## Cutting Properties of Dental Burs: Report

(Continued from page 115)

burs and of diamond abrasive wheels was compared.

Method: 1. The bur or diamond wheel under investigation was placed in the draw collet chuck and rotated against an extracted human tooth.

2. The tooth was held by a jig mounted on the roller carriage.

3. The tooth was pressed against the rotating instrument by means of suspended weights which were varied to produce different degrees of pressure.

Results: 1. It was shown that diamond instruments cut tooth enamel more rapidly at speeds of 10,000 rpm than 5,000 rpm.

2. Diamond wheels are many times more efficient than either steel or carbide when cutting tooth enamel.

3. The cutting rates of both steel and carbide burs are similarly improved at the higher speed when cutting dentin.

4. Carbide burs cut dentin at about twice the rate of steel burs at 10,000 rpm.

### Conclusion

In general, high speed rotation enables dental instruments to cut teeth faster with less pressure and with lessened probability of damage to tooth structure when proper cooling is employed. Many dentists also feel that better control of the instrument results when high rotating speeds are used.

Adapted from *Technical Report*, National Bureau of Standards, U.S. Department of Commerce.

## Vitamin B<sub>12</sub> in Trigeminal Neuralgia

THE EFFECT of massive dosage of vitamin B<sub>12</sub> has been tried in eighteen cases of trigeminal neuralgia and one case of glossopharyngeal neuralgia.

Considerable symptomatic improvement took place in fifteen of these cases after treatment.

The results suggest that vitamin B<sub>12</sub> used in this dosage can pro-

duce a remission which may be continued for a long time; but there is no evidence that this treatment will permanently cure trigeminal neuralgia.

From *Lancet* No. 6809:441 (Feb. 27) 1954.

## Horizons of Hope

JAMES EWING often remarked that cancer was not one disease but a thousand different diseases. It seems possible that this theory will be substantiated by research even

though definite cytochemical distinctions between cancer and normal cells have been established. Because of the complexity of the problem, cancer research is being de-

veloped in biochemistry, metabolism, nutrition, cellular physiology, genetics, physics, radiobiology, and many specialized projects.

From *Cancer Bulletin* 6:121 (Sept.-Oct.) 1954.

# Controlled Rapid TERMINATION OF ANESTHESIA

## After Dental Procedures: Use of Hyaluronidase.

### Preliminary Report

GEORGE A. HECTOR, D.D.S., Pleasanton, California

#### DIGEST

*There are numerous reports of procedures and agents useful in enhancing the depth, duration, and tissue compatibility of injected anesthetics. Few studies are available, however, of methods for the rapid dissipation of signs of anesthesia after operative procedures are completed. To the average dental patient the often prolonged duration of anesthesia about the face and lips is highly undesirable for social, esthetic, and functional reasons. This article reports the use of a specific agent for this purpose and describes in detail the technique employed in its application.*

#### New Agent Introduced

With the introduction of hyaluronidase\* which has been widely used as an adjunct to anesthesia,<sup>1,2</sup> hypodermoclysis,<sup>3,4</sup> and in the reduction of traumatic swellings,<sup>4,7</sup> it appeared appropriate to investigate the possi-

bility of hastening recovery from local anesthetic with the enzymic "spreading factor." It was thought that the ability of the enzyme to facilitate diffusion of fluid in tissues might serve to dissipate the effect of the anesthetic, and thereby rapidly terminate the postanesthetic manifestations.

**Procedure Investigated**—The author was the first of a series of six patients tested to determine the possibilities of this procedure. The method used was the following:

1. 1.8 cubic centimeters lidocaine (Xylocaine®) 2 per cent solution with epinephrine 1:50,000 was prepared.

2. One-half this amount was infiltrated over the apex of the right maxillary cuspid, and the remainder over the left maxillary cuspid.

3. A solution of hyaluronidase was prepared by dissolving 150 USP (turbidity reducing) units in 5 cubic centimeters of sterile water (it was later found that sterile normal saline is preferable), yielding a concentration of 30 USP units per cubic centimeters.

4. Thirty minutes after administration of the anesthetic, 2 cubic centimeters of the hyaluronidase solution (60 USP units) were injected into the anesthetized area over the right cuspid; the left cuspid area served as control.

**Sensation Decreased**—Thirty minutes after injection of hyaluronidase solution the sensation of thickness of the bone and mucous membrane on the right began to disappear. Anesthesia subsided rapidly from the right lip; 105 minutes after the injection of the hyaluronidase (135

minutes after injection of the anesthetic), motor and sensory recovery was sufficient to permit coffee to be taken on that side and a cigarette to be held between the lips.

**Normal Sensation Delayed on Control Side**—On the control left side a profound anesthesia persisted for 225 minutes and normal sensation returned only after four hours.

**Volume of Injection Arbitrary**—The dosage of hyaluronidase used in the experiment was arbitrary since no information was available for such a procedure. In view of the above experience, additional tests were undertaken to obtain information regarding the effects of enzyme dosage and of volume of injection.

#### Investigation Extended

**Group One**—Five tuberculous patients of the Arroyo Sanatorium were studied. The principle of contralateral injection and control was adopted throughout. The following steps were taken:

1. One cubic centimeter of normal saline solution was added to 150 USP units of hyaluronidase and 0.5 cubic centimeters, or 75 USP units, were injected approximately into the site of the needle puncture for the lidocaine injection which had been made 30 minutes earlier.

2. The needle was left in the tissue and another syringe containing normal saline solution was attached.

3. Four cubic centimeters of normal saline solution were then injected to create interstitial pressure, forcing the hyaluronidase over the area.

4. Testing for sensory reflexes was accomplished by touching lips and mucous membrane with a sharp explorer. Movement of lips determined motor reflexes. Table I shows the results in these cases.

\*Lyophilized hyaluronidase (Wydase®) in vials of 150 USP units (turbidity reducing) was supplied by Wyeth Laboratories, Philadelphia, Pennsylvania, for use in these experiments.

<sup>1</sup>Looby, J. P., and Kirby, C. K.: Use of Hyaluronidase with Local Anesthetic Agents in Dentistry, *JADA* 38:1 (Jan.) 1949.

<sup>2</sup>Kirby, C. K., Eckenhoff, J. E., and Looby, J. P.: The Use of Hyaluronidase with Local Anesthetic Agents in Nerve Block and Infiltration Anesthesia, *Surgery* 25:101 (Jan.) 1949.

<sup>3</sup>Schwartzman, J., Henderson, A. T., and King, W. E.: Hyaluronidase in Fluid Administration, *J. Pediatr.* 33:267 (Sept.) 1948.

<sup>4</sup>Britton, R. C., and Habib, D. V.: Clinical Uses of Hyaluronidase, *Surgery* 33:917 (June) 1953.

<sup>5</sup>Benzer, P.: A Preliminary Report on the Use of Hyaluronidase in the Treatment of Traumatic Swellings, *Oral Surg., Oral Med., & Oral Pathol.* 4:1315 (Dec.) 1951.

<sup>6</sup>Benzer, P., and Schaffer, A. B.: The Use of Hyaluronidase in the Treatment of Traumatic Swellings, *Oral Surg., Oral Med., & Oral Pathol.* 5:1315 (Dec.) 1952.

<sup>7</sup>Young, H. E., and Kingsbury, B. C., Jr.: Hyaluronidase for Prevention of Edema after Removal of Impacted Mandibular Third Molars, *JADA* 50:418 (Apr.) 1955.

**TABLE 1**  
**Reduction in Duration of Anesthesia**

Lidocaine (Xylocaine®) hydrochloride 2 per cent solution with epinephrine 1:100,000, 0.9 cc. each side  
Hyaluronidase, 75 USP units; Fluid Volume, 4.5 cc. (0.5 plus 4 cc. saline).

Case	Duration of Anesthesia (minutes)		Reduction (min.)
	Control side	Treated side*	
1	140	60	80
2	95	45	50
3	130	60	70
4	95	60	35
5	165	120	45
Average	125	69	56

\*Includes 30-minute interval for operative procedure before injection of hyaluronidase.

**TABLE 2**  
**Reduction in Duration of Anesthesia (Fluid Volume, 2 cc.)**

Hyaluronidase, 60 USP units (30 USP units/cc.)

Lidocaine (Xylocaine®) hydrochloride 2 per cent solution with epinephrine 1:50,000, 0.9 cc. each side

Case	Duration of Anesthesia (minutes)		Reduction (min.)
	Control side	Treated side*	
6	225	135	90
7	115	65	50
8	225	150	75
9	230	140	90
10	225	140	85
Average	204	126	78

Hyaluronidase, 15 USP units (7.5 USP units/cc.)

11	170	150	20
12	225	140	80
13	230	200	30
Average	208	163	45

\*Includes 30-minute interval for operative procedure before injection of hyaluronidase.

**TABLE 3**  
**Reduction in Duration of Anesthesia**

Lidocaine (Xylocaine®) hydrochloride 2 per cent solution with epinephrine 1:100,000, 0.9 cc. each side

Hyaluronidase, 150 USP units; Fluid Volume, 1 cc.

Case	Duration of Anesthesia (minutes)		Reduction (min.)
	Control side	Treated side*	
14	157	95	62
15	160	115	45
16	200	125	75
Average	172	111	60

Hyaluronidase, 300 USP units; Fluid Volume, 1 cc.

17	195	135	60
18	174	82	92
19	190	150	40
20	140	70	70
21	175	85	90
22	180	95	85
Average	175	103	73

\*Includes 30-minute interval for operative procedure before injection of hyaluronidase.

**Group Two**—Eight subjects were treated in the same manner as that described in Group One with Hyaluronidase injected in a total volume of 2 cubic centimeters. Five of these received 60 USP units of enzyme, and

three received 15 USP units. The results are given in Table Two.

**Effect of Fluid Volume Investigated:** The only patients who secured less than 33 per cent reduction in anesthesia time were in the group receiving

15 USP units of hyaluronidase. This dosage was therefore considered to approach extinction of enzyme effect. To determine whether fluid volume alone might produce an effect, one bilaterally anesthetized subject received hyaluronidase 150 USP units on one side, and saline on the other, 1 cubic centimeter in each case.

**Reduction of Duration:** The duration of anesthesia was 190 minutes on the control side and 100 minutes on the treated side, a reduction of 47.4 per cent.

**Group Three**—This group received 1 cubic centimeter of hyaluronidase solution on the treated side, in concentrations of 150 and 300 USP units per cubic centimeters. The results of these tests are shown in Table Three.

## Discussion

The studies described demonstrate that it is possible to accelerate dissipation of the anesthesia from injected lidocaine by means of hyaluronidase. In these experiments the enzyme was injected thirty minutes after administration of the anesthetic solution. This time interval naturally affects duration of anesthesia. It is desirable to include it because of the following considerations, (1) securing adequate anesthesia, and (2) allowing for an elapse of time corresponding roughly to that required for a restorative dental procedure.

### Variation in Effects not Significant

—Differences among the groups studied were not highly significant except for the group receiving 15 USP units of hyaluronidase and those receiving 300 USP units.

### Additional Beneficial Results

—Apart from the cosmetic and functional advantages of the procedure, beneficial results regularly reported included an earlier feeling of softness and comfort on the treated side, often appearing within two to five minutes. In many cases the customary "itching" and disagreeable paresthesias during the terminal stages of anesthesia were favorably influenced.

### Unfavorable Results Absent

—The use of hyaluronidase was in no case attended by significant unfavorable effect; one patient complained of tenderness at the site of injection.

**Further Studies Planned**—This preliminary report is presented in the hope that it will stimulate further investigation of the procedure. Additional investigation is planned with reference to dental block anesthesia and refinement of technique of hyaluronidase administration.

### Summary

1. Dissipation of anesthetic effects of injected lidocaine was accelerated

by injection of hyaluronidase into the site of the local anesthetic in 23 subjects.

2. Customary "itching" and disagreeable paresthesias during the terminal stages of anesthesia were favorably modified.

3. No systemic reactions to hyaluronidase were observed.

4. Further study of the procedure is indicated.

5. Patient reaction to rapid termin-

ation of anesthesia on the treated side versus control side was demonstrated by many favorable comments.

12 Neal Street

**Author's Note:** The patients studied in these experiments were from the Fairmont Hospital and Arroyo Sanatorium, Alameda County Institutions, California.

## Food for Life

RALPH W. GERARD, Ph.D., M.D.

THE FACT is that the second law of thermodynamics applies quite as rigidly to the human machine as it does to any other. No one has ever been known to create energy or matter without taking into his body the equivalent of that energy or matter in the form of food. Nor does anyone have the gift of the vegetable kingdom, the ability to synthesize carbohydrate from sunshine,

air, and water. The weight of the body is solely and strictly determined by the difference between the number of calories presented by the 24-hour food intake that is digested and absorbed and the number of calories expended in the form of heat and external work during the same period. A gain in weight, beyond any temporary fluctuation which might be caused by a tran-

sient retention of water, is direct evidence that the person has over-eaten. It is true, however, that endocrine diseases or emotional disturbances can lead to obesity in one of two ways. They either slow the metabolism and decrease the rate of work and heat production while the food intake remains high, or they increase the appetite (thus the food intake) without changing the heat production or the work accomplished.

*University of Chicago Press, 1955.*

## Notable Change in American Diet

It is the very large increase in the consumption of sugar for candies, confections, syrups, and beverages that is the one outstanding change for the worse in the American diet. The use of cane and beet sugar increased from 73 pounds per person per year in 1908 to 103.6 pounds in 1922 and then shrank, after a dip to 78 during the war years, to 96 pounds in 1948. The figure would be still larger, however, if the sugar used for canned fruits were included. In addition, the consumption of corn syrup increased from 4.8 to 8.2 pounds and that of corn

sugar from 1.1 to 4 pounds. America is now the largest consumer of sugar among all nations but ranks below Australia and New Zealand in its consumption per person.

### Refined Sugar Inadequate as Food

In a state of nature, man's sweet taste was a blessing, by attracting him to the many fruits that are rich in vitamins. But today the refining of sugar has reached such a state of perfection that all vitamins and minerals that are present in the cane or beet are left behind with

the molasses and benefit only the cattle that are fed the molasses or its residue after distilleries convert molasses into alcohol. The glistening white crystals of sugar provide men with his cheapest and purest food, yet the very purity makes it objectionable. It is pure calories, which man (or woman or child, in this case) does not need, or at least would much better obtain from foods that also give him a balance of protein, vitamins, and minerals.

From *Food for Life* by Ralph W. Gerard, Ph.D., M.D., *University of Chicago Press, 1955.*



## The EDITOR'S Page

FROM TIME to time we have published material from reliable sources that suggested that there might possibly be cumulative and harmful toxic reactions from ingesting fluoridated water. This does not mean that these original sources or that this dental publication is in the camp of the antifluoridationists. This kind of material has appeared here in print because we believe that the purpose of a publication that circulates among people with a scientific training is to explore *all* the facts on an important health subject; not merely publish material that suits a preconception or that bolsters an assumption.

On this occasion we take the opportunity to present the results of a detailed study on the kidney functions of a group of 12-year-old boys in the population of the fluoride-water community of Newburgh, New York as compared with the fluoride-free control city of Kingston, New York.<sup>1</sup> This study demonstrates that there is no evidence of kidney damage to the boys who have drunk fluoridated water for more than eight years.

Here are the summary and conclusions from this study:

"A special study was made of the quantitative excretion of albumin, red blood cells, and casts in 12-hour urine specimens in 12-year-old boys as part of the long-term study of children in the Newburgh-Kingston caries fluorine study. The objective of this study was to determine whether any irritative effects on the kidneys followed long-term ingestion of fluoridated water, with use of a more refined technique than routine urine analysis, which is performed as part of the annual pediatric examinations in the Newburgh-Kingston study. The findings in a group of 100 boys in Newburgh who had been exposed to fluoridated drinking water for about eight years were compared with the findings in a group of similar size in Kingston, where the drinking water is essentially fluoride-free. The collection and examination of urine specimens followed the Addis method as modified by Lippman. No limitation was

placed on the boys' physical activity prior to collection of the 12-hour specimens.

"The mean of the albumin determinations in the Kingston specimens was 34.1 milligrams, with a standard deviation of 12.9 milligrams. The corresponding mean and standard deviation for Newburgh was 29.0 milligrams and 13.4 milligrams respectively. The average number of red blood cells excreted in the Kingston specimens was 14,700 and in the Newburgh specimens 10,300. In the Kingston group, 60 per cent of the specimens showed a red blood cell count under 20,000 and in the Newburgh group this was true of 78 per cent. The average number of casts in the Kingston specimens was 2,800 and in the Newburgh specimens 1,900. In the Kingston group, no casts were found in 56 per cent of the specimens, and in the Newburgh group no casts were found in 68 per cent of the specimens.

"The differences found in the results from the groups in the two cities tended to favor the Newburgh children. No medical significance can be attributed to any of the differences. This study adds further weight to the mass of evidence already available that points to the safety of water fluoridation as a public health measure for the prevention of dental caries."

This careful evaluation study represents what should be done on other aspects of the fluoridation program. It has been suggested that the rate of the degenerative diseases is higher among adults in communities where the water supply has been fluoridated. A worthwhile research project should be set up to determine if this is true or false.

In the Newburgh-Kingston project 900 children are being studied over a 10-year period to determine if there are possible systemic ill effects from drinking fluoridated water. These studies include "careful pediatric examinations, measurement of height and weight, x-rays of the wrists and knees, blood cell counts, and special ophthalmologic and otological examinations." In this same project comparative medical studies might be made among groups of *adults* in the two communities.

<sup>1</sup>Schlesinger, Edward R.; Overton, David E.; and Chase, Helen C.: Study of Children Drinking Fluoridated and Nonfluoridated Water, Quantitative Urinary Excretion of Albumin and Formed Elements, JAMA 160:24 (Jan. 7) 1956.

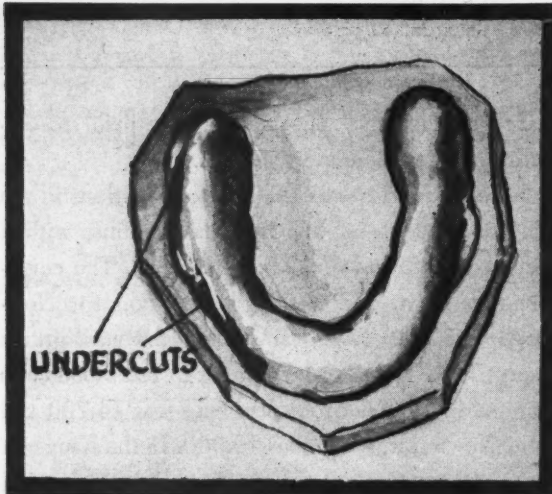
## ***Clinical and Laboratory***

### **Undercuts in Models**

Maxine Adams, D. A., Clarksburg, Virginia

**1.** Wet a piece of asbestos and adapt it to the undercuts on the model with a rubber eraser. This will prevent chipping the model when manipulating the baseplate. Remove the asbestos before the denture is processed.

**1**



### **Preventing Baseplates from Sticking**

Clarence R. Miedema, D.D.S., Chicago

**2.** To prevent hot baseplates from sticking to the model rub the model with a small cloth bag containing talcum powder.

**2**

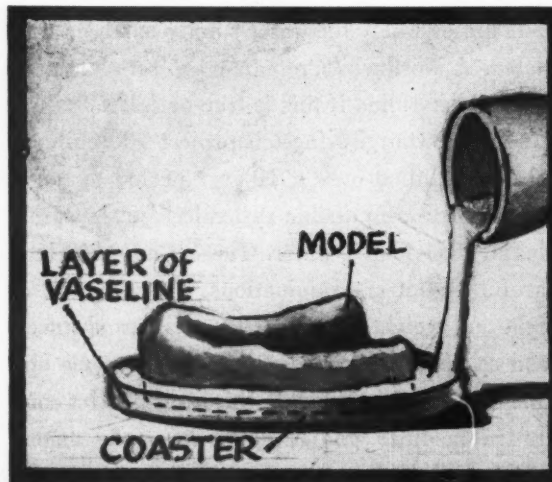


### **A Base for Models**

Ben E. Pleshette, D.D.S., New York

**3.** A neat base for models may be made by using a plastic drinking glass coaster. Coat the inside of the coaster with Vaseline®. Pour the model and allow it to set in the coaster.

**3**



### **READERS are Urged to Collect \$10.00**

For every practical clinical or laboratory suggestion that is usable, DENTAL DIGEST will pay \$10.00 on publication.

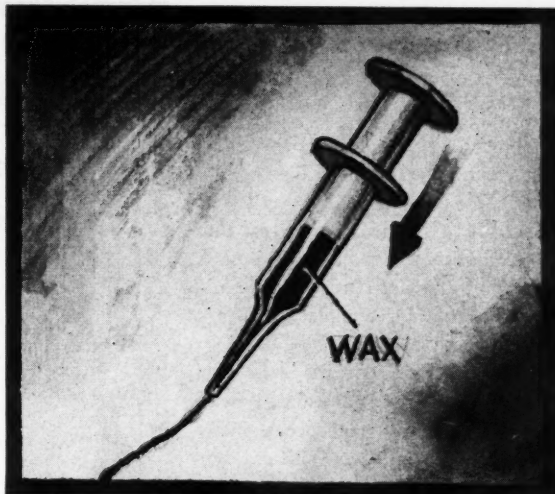
You do not have to write an article. Furnish us with rough drawings or sketches, from which we will make suitable illustrations; write a brief description of the

## SUGGESTIONS . . .

### A Wax Gun

Claude P. Carpenter, D.D.S., Milwaukee, Wisconsin

4. Use a discarded penicillin syringe. Put the inlay wax in the syringe and place in warm water. When the wax is soft it can be ejected from the syringe.

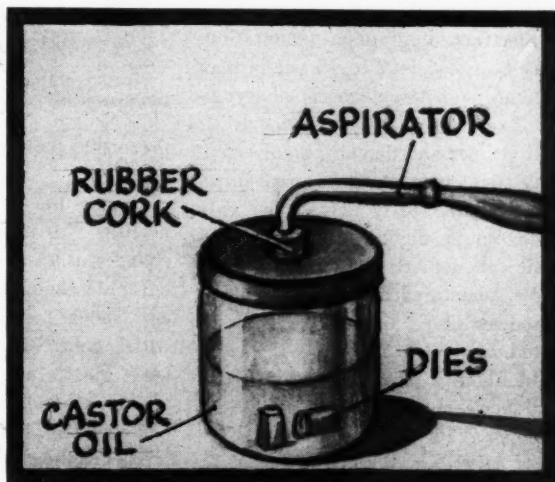


4

### An Oil-Impregnated Model

Kenneth Clond, D.D.S., Muskogee, Oklahoma

5. Use a wide mouth pint jar the lid of which has had a rubber cork fitted through it. Insert a large aspirator tip through the cork. Pour castor oil in the jar until it is half full. Place the model in the jar and let the aspirator run for 30 minutes.

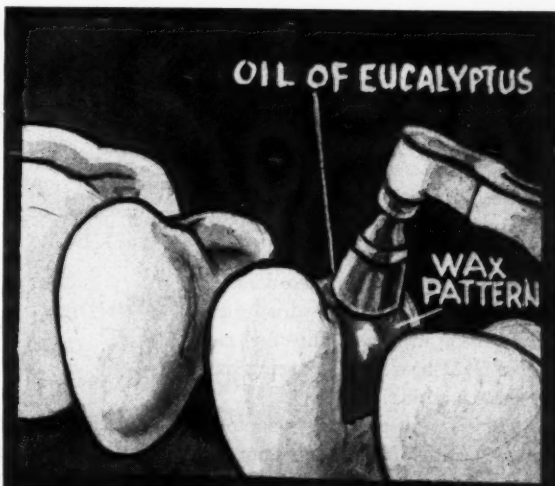


5

### Smoothing Wax Patterns

Charles Kalpakian, D.D.S., Huntington, New York

6. After carving the wax pattern, put a drop of oil of eucalyptus on a mounted rubber polishing cup and gently polish the pattern.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 135 for a convenient form to use.

Send your ideas to Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.





# MEDICINE

## and the Biologic Sciences

Clinically unrecognized cardiac damage may be produced by some infectious diseases. Anatomic and electrocardiographic studies suggest that these changes take place. Although threat to life is not always immediate, the prognosis for complete recovery is frequently uncertain.

Acute rheumatic carditis is the most common condition associated with beta hemolytic streptococcus infections. (1) Arrhythmias, (2) enlargement of the heart, (3) murmurs, (4) friction rubs, and (5) failure may be detected within ten days to six weeks after initiation of pharyngeal infection. Pancarditis may cause death.

Electrocardiographic alterations may be noted in 7 to 15 per cent of patients with streptococcal pharyngitis or scarlet fever. Acute endocarditis with primary aortic valve involvement may result from staphylococcal infections. In the early stages, the only symptom is slight fever. Later, embolic phenomena appear. In fatal cases, acute myocarditis and multiple abscesses of cardiac muscle may be noted.

In about 10 per cent of cases of diphtheria, myocarditis is recognized clinically. Physical examination reveals softening of the heart sounds, extrasystoles, gallop rhythm, auricular fibrillation, ventricular tachycardia, heart block and cardiac decompensation. Pain in the upper right quadrant and hepatomegaly are usually the first manifestations of congestive failure. Heart disease associated with diphtheria is not benign and depletes the cardiac reserve important at an older age when hypertension or coronary disease may occur.

Pertussis, despite severe bronchitis, atelectasis and pneumonia, seldom produces permanent cardiac damage. However, the electrocardiographic studies show an almost universal pattern of right heart strain during paroxysmal coughing.

Measles rarely produces symptoms of myocarditis. Mumps occasionally causes myocarditis, manifested by



precordial pain, dyspnea and palpitation.

During the acute phase of poliomyelitis hypertension, anatomic changes in heart muscle, electrocardiographic changes, pulmonary edema, and shock may occur. Focal interstitial collection of lymphocytes in heart muscle are associated with hypoxia. Necrosis of muscle cells and neutrophilic infiltrate apparently are related to the virus infection.

Cardiac dilatation, sudden death during convalescence, bradycardia, extrasystoles and partial or complete heart block occur with influenza. Weakness, dyspnea, extreme malaise, and sudden death indicate cardiac involvement.

*Weinstein, Louis: Cardiovascular Manifestations in some of the Common Infectious Diseases, Mod. Concepts Cardiovas. Dis. 23:229-233 (June) 1954.*



### Diphtheria

Fatalities and complications of diphtheria are effectively reduced by early administration of diphtheria

antitoxin. From 20,000 to 80,000 units should be injected depending upon the severity and duration of the diphtheria and degree of toxicity. Apparently penicillin does not affect the outcome. Tracheotomy is usually preferable to intervention when an artificial airway is required.

Mortality is higher among males than among females, partly because men enter the hospital later during the course of the disease than women. The higher death rate among chronic alcoholics may be related to delay in treatment. The incident of deaths is lower among Negroes than among Caucasians.

The least hazardous forms of the disease are (1) tonsillopharyngeal diphtheria, the most common form, (2) primary lesions, and (3) primary laryngeal lesions. Mortality risk increases with secondary involvement and is highest with (1) cervical adenitis, (2) tracheobronchial diphtheria, (3) laryngotracheobronchial diphtheria, and (4) among persons with wound infections.

Extrarespiratory forms including diphtheria of ear, conjunctiva, skin, umbilicus, and vagina, are uncommon in the United States. Death may occur even though the infections do not cause systemic reactions.

The incidence of myocarditis, pneumonia and bulbar and peripheral paralysis with diphtheria is proportional to the length of time between onset of disease and administration of antitoxin. Mortality rate from myocarditis is apparently unaffected by the stage at which antitoxin is given, but pneumonia deaths increase with delay.

Neuritis is more common among adults than children. Paralysis may occur a month or more after onset of diphtheria and is frequently coexistent with myocarditis. Death may result from pharyngeal paralysis with secondary aspiration pneumonia. Most patients with nerve involvement never recover normal function. Other complications of diphtheria are encephalitis, otitis media, renal involvement and serum reactions.

Fatalities increase sharply among patients with white blood counts over

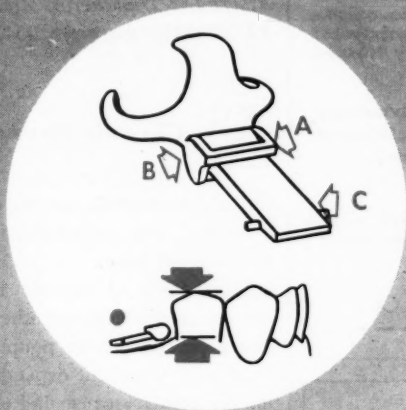
# ADVANCED PROSTHETICS



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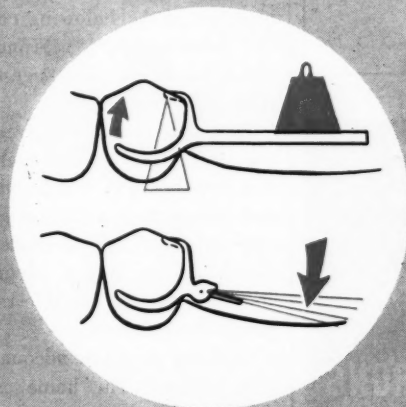
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25,000. However, among patients with pneumonia, death is most frequent when the initial white blood count is below 15,000.

Approximately 57 per cent of the cases occur in children under 10 years. The incidence of the disease among children is highest during the first few school months of each year. The death rate is about 4 per cent among patients treated within the first day of onset of the disease. However, when therapy is delayed eight or more days the death rate is approximately 20 per cent.

*Naiditch, Morris J., and Bower, Albert G.: Diphtheria, Am. J. Med. 17:229-245 (August) 1954.*



**Chronic Bronchitis**

Chronic bronchitis can be extremely annoying and embarrassing to the professional man.

Most cases of chronic bronchitis are secondary to some other disease, either pulmonary or nonpulmonary. Successful treatment depends on finding the primary cause and eliminating it if possible. Vigorous treatment should be instituted promptly with presence of the following conditions: (1) tuberculosis, (2) bronchiectasis, (3) a tumor, or (4) congestive heart failure.

Attention should be given to diet, rest, recreation, and general hygiene. The diet should be simple, wholesome, and sufficient to maintain a satisfactory weight. A life of moderation in all things, including adequate rest and sufficient but suitable recreation, should be followed.

Clothing should be adequate to prevent chilling. The home and office should be kept at an even temperature and comfortably warm but not overheated. Tonics, hormones, and vitamins may be helpful.

Usually symptoms will be fewer in a warm, mild dry climate free of smoke and irritating fumes. It is not always feasible, however, nor desirable to make a move to a different climate.

It is probable that there is always



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some aggravation of cough as a result of smoking. The expectorants provide symptomatic relief in patients with severe cough whose sputum is thick and tenacious. The bronchodilator drugs such as (1) epinephrine, (2) ephedrine sulphate, (3) atropine, and (4) aminophylline accomplish as much when given orally as when given by inhalation or injection. The results achieved with antihistaminic drugs have been disappointing.

In the subacute phase of the disease or during an exacerbation of the chronic process, the sulfonamides and antibiotics are most effective. There is no known treatment, however, that will eradicate the infection of chronic bronchitis. Care and good judgment are, therefore, needed in deciding when administration of sulfonamides and the antibiotics is indicated and how long they should be continued since these drugs should not be administered over long periods.

Dunn, W. L.: *Treatment of Chronic Bronchitis*, Virginia M. Monthly 81:375-377 (August) 1954.



### **Dermatitis Caused by Shoes**

A contact dermatitis of the feet due to shoes may closely resemble dermatophytosis. It may become severe enough to prevent walking. In addition to the primary lesions, a secondary generalized dermatitis with (1) cellulitis, (2) lymphangitis, (3) lymphadenitis, (4) thrombophlebitis, or (5) nephritis may develop.

The anterodorsal portion of the foot is most commonly involved. Usually the lesion begins on the dorsal surface of the big toe as a slight erythema with scaling. Gradually it becomes vesiculated and involves the backs of the adjoining toes. The inflammation may remain localized or spread to the distal half of the dorsum of the foot, the interdigital webs, or occasionally, the plantar surface. Another form of involvement is localized to the heel pad or the sole.

The dermatitis may be unilateral or bilateral. When bilateral, involvement of the second foot may be almost

simultaneous or may occur weeks or even months later. The dermatitis is usually associated with severe pruritis and secondary infection may develop from scratching. Similar reactions sometimes appear on the hands and forearms.

The common offending material is the thermoplastic material used in the box toes of shoes. The accelerators and antioxidants in rubber, which is the basic ingredient of thermoplastic material, are the actual sensitizers.

The patient probably always wears a stocking or sock, but perspiration easily passes through, allowing contact with the sensitizing material.

There appears to be no correlation between the length of time the shoes are worn and the onset of the dermatitis. Excessive sweating of the feet or wetting of the shoes by rain or snow may initiate or exacerbate the lesion.

Patch testing of patients has given erratic and inconsistent results. Explanation of the varying results prob-

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ably comes from perspiration leeching out sensitizing materials.

Treatment consists of eliminating shoes with thermoplastic material or rubber midsoles or heels, depending on the location of the dermatitis. Shoes made with flannel box toes should be worn instead.

*Shatin, Harry, and Reisch, Milton: Dermatitis of the Feet due to Shoes, Arch. Dermat. & Syphilis 69:651-666 (August) 1954.*



### **Activity after Poliomyelitis**

Activity may be defined as any stress from movement or position within or upon bodily segments. The resumption of neuromuscular activity can be the most beneficial and also the most dangerous aspect of therapy of the after effects of acute anterior poliomyelitis.

If the patient remains motionless

in bed, strength, coordination and endurance cannot be recovered. Overactivity, however, either accidental or incorrectly prescribed, leads to (1) structural distortions, (2) faulty patterns of movement, and (3) loss of muscle strength.

In the early recovery stage when muscles are too weak to support activity corsets, braces, crutches, and splints are sometimes needed. Such aids permit and encourage early safe activity but should be discarded when increased strength allows proper bone and joint alignment.

Muscular weakness and demineralization of bones permit rapid changes in bone contour and joint mobility. Faulty postures are responsible for persistent abnormal stress during either rest or activity. Incorrect patterns of movement, however, may be more dangerous than faulty rest positions.

Poliomyelitis tends to involve entire body segments such as the forearm and hand, shoulder and arm, hip and thigh, or leg and foot. In such



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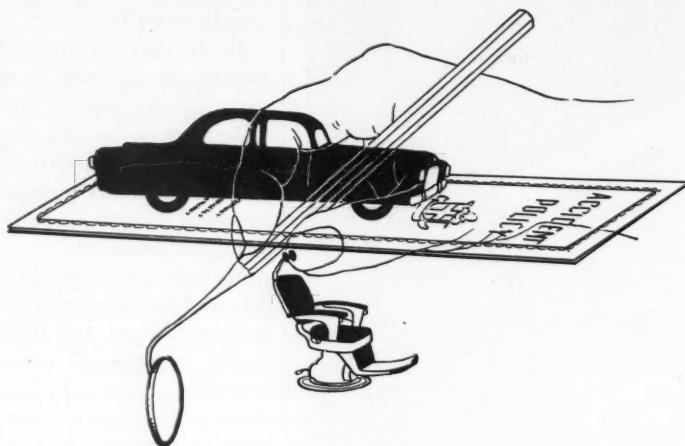
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## In your ORAL HYGIENE this month



### It Can Happen to Any of Us

"The force of the impact, I was told, was sufficient to turn us end-over-end two or three times and to write finis, after thirty-eight years, to my career as a practicing dentist."

Doctor Frank Entwistle is describing the accident in which his right hand was badly smashed. He speaks from experience and with conviction when he urges dentists to insure their hands and eyes and to carry adequate hospital and accident insurance.

Fortunately, Doctor Entwistle has a second talent and is now turning his keen mind and buoyant energy to the field of writing.

★ ★ ★

"Why Not Automation in Dentistry?" asks Doctor Maurice J. Teitelbaum, as he outlines the methods of dental treatment that may be standard practice at some time in the future, perhaps the very far future.

★ ★ ★

Doctor E. F. Giannangelo of Pratt, Kansas, has just finished a year as president of the Kansas Junior Chamber of Commerce, and tells of the satisfaction he feels at having mixed "Civic Service and Dentistry."

★ ★ ★

"The 'Do-It-Yourself' Investment Policy" is dangerous unless the dentist has first made provision for certain contingencies. Doctor John W.

Bowyer, Jr. suggests that every dentist answer seven questions before starting on what he calls a "myopic quest for spectacular increase in wealth."

★ ★ ★

Do you favor hospital "Internships for Dentistry"? Doctor Marvin E. Pizer does, and gives his reasons for wishing to add this extra year to the dentists' already long period of training.

★ ★ ★

Before you tell the printer to "duplicate the last order," why not get some professional advice on selecting "Your Business Stationery." The article by Lois Hoffman and Edwin N. Perrin discusses cost, size, and appearance of various types of letterheads, cards, envelopes, and prescription blanks. You may find that you can improve present quality and appearance without seriously increasing cost.

★ ★ ★

Thumb sucking and other "Unhealthful Oral Habits" may not be as detrimental to the child's welfare as we have been led to believe. Doctor Irving H. Barnett believes that these practices fill a basic need for some children, and that their correction may force the child to substitute other, even more undesirable practices.

segments, all muscles are weakened to some extent. Position and reflex advantages permit some to recover earlier than others.

Two or three months after the acute stage, all motor units not destroyed by the virus have fully recovered and the anatomic pattern is set. Treatment is aimed at efficient use of the remaining motor units, since normal usual activities are possible with less than the normal number of units. Each muscle fiber must be hypertrophied and every nerve pathway must be efficiently coordinated.

With unlimited activity, stronger muscle groups may be employed to the disadvantage of weaker groups, provoking abnormal or substitute movement patterns. Such patterns are not only inefficient, awkward and fatiguing but may become habitual.

Hand weakness, particularly of the intrinsic musculature, should be determined early and functional splinting applied immediately. The splint should support bone, joint, and muscle but also allow use of whatever strength remains.

Sitting erect places stress upon the spine and endangers alignment. The position tends to promote hip and knee flexion contractures and equinus positions of the feet. Sitting should be started as soon as possible after the acute stage, with the use of supports if needed.

Standing is essential to promote proprioceptive reflexes. Even severely involved patients should stand for psychologic and functional reasons. Crutches, corsets, and braces are used when needed. Walking is hazardous but essential to recovery and should not be delayed beyond six months except in extremely young or critically ill patients.

Bennett, Robert L.: *Resumption of Activity Following Poliomyelitis*. J. M. A. Georgia 43:706-708 (August) 1954.

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# Contra- Angles



EVERY vocation has a jargon. To an outsider the words are often unintelligible. Dentists talk about MOD's, cast skeletons, dry sockets, jackets, partials—and these words mystify the public. The young people who "rock and roll" have their own kind of music and their own jargon to describe it. At the other pole of the intellectual area are the philosophers who speak a language of massive words with profundity of meaning.

One form of jargon that has crept into the general conversation at the higher levels is the language of psychiatrists. With so many people plagued with nervous disorders it is

understandable how their lingo has an appeal to many people. The best simplified definitions of the terms to describe the mechanisms that we all use, more or less, to defend ourselves against psychologic stress were given in that superb journal *The Psychiatric Bulletin* published at the University of Texas.

Russell W. Cumley, Ph.D., and R. Lee Clark, Jr., M.D. took upon themselves, with able help from an advisory board, the commendable assignment of making psychiatry understandable to the physician in general practice. Dentists who likewise come upon distraught or disturbed persons would also profit from the regular reading of this *Bulletin*.

As a good example of the excellence of the material in *The Psychiatric Bulletin* are the descriptions of defense mechanisms:

"Many of these defense mechanisms were first recognized in clinical practice. In the past few decades rigorous experimental attempts have been made to confirm the validity of these clinical observations.

"*Identification* — Identification is the conscious or unconscious process by which one individual adopts perceived and desired personality characteristics of another person. Instances of this mechanism are often seen in boys who idealize their fathers. They soon demonstrate some of the male parent's mannerisms. Thus, in much more than a genetic sense, they become a 'chip off the old block.'

"*Projection*—Projection is the act whereby an individual ascribes to other persons certain personality traits or behavior which, in reality, belong to himself. The boss who berates his secretary for a mistake for which he alone is to blame, would serve as an example of this defense.

"*Fixation*—Fixation is a term having two psychologic meanings. As used by psychoanalysts it indicates the arrest of psychosexual development below the level of adulthood. The analyst says that the older child who sucks his thumb is showing evidence of remaining at the earliest, or oral stage of psychosexual development.

## CLINICAL AND LABORATORY SUGGESTIONS

(See pages 126 and 127)

Form to be Used by Contributors  
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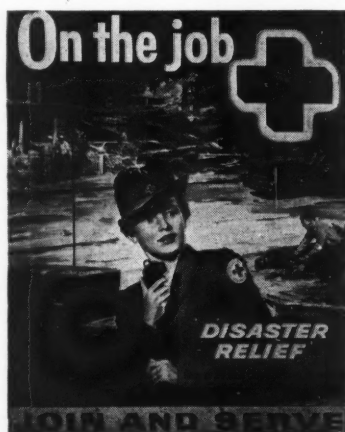
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"More generally, fixation is used to indicate the arrest of psychologic development without regard to psychosexual factors. The adult who still relies on his parents in making all of his decisions is an example of fixation in this concept.

"*Displacement* — Displacement refers to the indirect expression of an emotion. The sergeant who is reprimanded by a superior officer and who gets rid of his resentment by taking it out on someone of lower rank illustrates the operation of this mechanism.

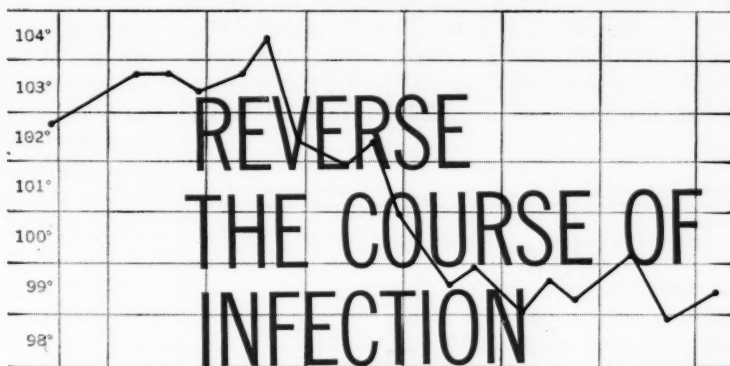
"*Reaction Formation* — The unconscious overdevelopment and expression of attitudes or beliefs which are directly opposed to those that are unacceptable to an individual is called reaction formation. Shakespeare recognized this mechanism when he had one of his characters say, 'methinks the lady doth protest too much.'

"*Sublimation* — Sublimation is the redirection of an unacceptable drive or motivation into socially acceptable channels. The person who does not directly express his sexual feelings but who writes love poems instead, is making use of this defense.

"*Regression* — Regression is the reappearance of behavior which is characteristic of a stage of development through which the subject has previously passed. Most physicians have dealt with the situation in which a newborn baby has been introduced into a family already containing an older child. The older child, perhaps four or five years of age, is well on his way to socialization. He has been toilet-trained, his speech is developing rapidly; he is able to eat at the table with his parents. At this point a curious change sometimes occurs. The parents, instead of focusing their full attention on the older child, as in the past, are now preoccupied with the baby. This sudden shift may lead to dramatic changes in the older child's behavior. He may develop nocturia; he may return to utilizing baby talk which he had previously discarded; he may have to be fed. These changes are explainable in terms of defense mechanisms. In this particular case, they are often called

NAME: John Doe

DIAGNOSIS: Periapical abscess



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attention-getting mechanisms. Here the older child responds to a felt deprivation by regressing to an earlier level of psychologic growth and development. He again utilizes techniques which served to satisfy his wants at earlier periods in his life.

**"Repression"**—The involuntary process of pushing and keeping from consciousness ideas which are unacceptable is called repression. An illustration of this mechanism is demonstrated in the following case. A girl in her early twenties came to a phy-

sician for treatment of a toxic goiter. In the course of taking the medical history, the patient was asked if she could recall any psychologic trauma which preceded the first noticeable symptoms of the disorder. She stated that she could not remember anything along these lines. Later questioning of the patient's relatives revealed that she was a bystander at the shooting of an uncle within this period of time. This experience was probably so upsetting that the patient had spontaneously expelled it from consciousness.

**"Compensation"** — Compensation is an attempt to overcome an undesirable and discomforting psychologic characteristic by means of some form of behavior which is more acceptable. The poised, even arrogant person may be compensating for his feelings of insecurity and uncertainty. Or, this defense mechanism may be exemplified in the area of wit and humor. There is the person who is always armed with a good joke; he can be relied upon for a laugh; he's a good party boy. Frequently, the motivation force behind this person's behavior is compensation. In this subtle way, he may be responding to feelings of inadequacy in relationships with others. In order to allay feelings of insecurity, these persons keep a stock of witticisms and anecdotes, and thus help themselves maintain their social role.

**"Rationalization"** — Rationalization is a method of avoiding stress by means of intellectual excuses. This defense mechanism is probably the most common of all those which have been proposed. The 'Alibi Ike' baseball player who says, 'I would have caught the ball but the sun was in my eyes,' is using this defense.

**"Compulsion"**—A compulsion is the involuntary need and act of carrying out some form of behavior, which has no reasonable purpose or value. An innocuous instance of this defense is often seen among children who may carefully avoid stepping on cracks in a cement sidewalk. A more psychopathologic example is that of Lady Macbeth, who manifests a hand washing compulsion to cleanse herself of guilt feelings.

**"Fantasy"**—Fantasy is an imaginary perception occurring in the waking state. It may vary from momentary day dreaming to marked and prolonged delusions as seen in schizophrenia.

We are not suggesting that dentists become psychiatrists by the reading of *The Psychiatric Bulletin*. The information gained from this journal will help dentists understand human beings and their multiple and varied problems. There is no more gratifying experience than that.

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## Nutrition in Oral

### Surgery

D. GORDON WALKER, A.B., D.D.S.,

Beaumont, Texas

### Therapy

The oral surgery patient offers a challenging nutritional problem, since the patient's intake of regular food is usually impaired by the surgical procedure for a variable length of time. Frequently he is unable to eat because of the pain and trismus often associated with a traumatizing intraoral operation, such as the removal of an infected mandibular third molar.

A preoperative evaluation of the patient's nutritional status should be made and if a deficiency is found, replacement therapy should be instituted immediately.

### Preoperative and Postoperative Nutrition

The preparation of a patient for an intraoral operation, regardless of its magnitude, should include a high protein diet and 100 milligrams daily of ascorbic acid for five days before the operation.

**Vitamin Supplement**—Sordes usually develops after intraoral operations because the patient cannot brush his teeth. This situation frequently leads to traumatic hemorrhagic gingivitis of varying severity. If adequate amounts of vitamin C are given pre and postoperatively, this condition can be alleviated. Vitamins, like other foodstuffs, are best taken by mouth and, if the patient is able to take food by mouth postoperatively, his diet should be supplemented twice daily by a formula similar to the following: vitamin A, 25,000 units; vitamin D, 1,000 units; thiamine, 5 milligrams; riboflavin, 5 milligrams; niacinamide, 150 milligrams; ascorbic acid, 250 milligrams; niacinamide, 150 milligrams; ascorbic acid, 250 milligrams; calcium pantothenate, 50 milligrams; and pyridoxine H Cl, 50 milligrams.

**High Protein Liquid Diet**—A rel-

atively palatable and convenient inexpensive high protein liquid diet is the following: 135 grams of dried skim milk powder; 70 grams of Casein; 15 grams of cocoa; 45 grams of sugar. This provides about 100 grams of protein and 100 grams of carbohydrate.

**Formula for Tube Feeding**—Amigen, 300 grams; Nutramigen, 150 grams; water, 3 liters. This provides 255 grams of protein and 1,565 calories. By adding 200 grams of dextrose, the caloric value can be raised to 2,365.

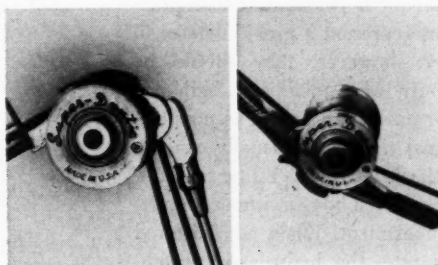
**Indications for Amino Acids**—When nourishment cannot be taken by mouth or when any of the other conditions are present which would indicate parenteral feeding, amino acids in the form of protein hydrolysate or mixtures of the ten essential amino acids plus glycine may be used.

In general, the clinical indications for the use of amino acids are: (1) inability to ingest any food, due to anatomic blockage or vomiting following the ingestion of food; (2) inability to digest or absorb food pro-

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tein, even though the patient can ingest it; (3) where resting of the gastrointestinal tract is required; (4) the inability to ingest and assimilate sufficient protein because of anorexia or limitation in digestive and adsorptive load on the intestines.

**Quantities Administered:** In providing protein parenterally, it is important to furnish sufficient calories so that infused amino acids will not be consumed for energy purposes and thus be lost for the synthesis of tissue protein. For this reason Amigen® is packaged as (1) Amigen® 5 per cent, in 5 per cent dextrose solution; (2) Amigen® 5 per cent, in 10 per cent dextrose solution; (3) Amigen® 3½ per cent, dextrose 3½ per cent, in 1/3 lactate—Ringer's solution; (4) Amigen® 5 per cent, dextrose 5 per cent, and alcohol 5 per cent. These preparations represent a great advance in therapy; however, they should be used only when definitely indicated and for as short a period as possible. A normal sized adult usually can tolerate the infusion of 1 liter of fluid in two or three hours without circulatory impairment. When administered at this rate, the hydrolyzed protein rarely produces nausea, a symptom frequently seen when faster rates are used.

**Contraindications:** Unfavorable symptoms, such as urticaria, rash, or severe vasomotor changes contraindicate the intravenous use of hydrolyzed protein.

**Indications for Parenteral Administration:** (1) When the patient is unable to take food by mouth; (2) when there is defective intestinal absorption; (3) when rapid utilization is desired in acute vitamin deficiency; (4) when large doses are required where disorder is present that oral preparation would aggravate; (5) when the patient is unable or unwilling to ingest specific vitamin preparations that are indicated.

**A Valuable Addition:** A soluble preparation of the principal B complex factors with ascorbic acid is a valuable addition to infusions of plasma, glucose, or protein. The following formula is suggested: Thiamine H Cl, 100 milligrams; pyri-

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CREST is the only toothpaste to present clinical evidence of significant decay reduction among children and adults after a full year of unsupervised home use. Therefore, CREST is recommended to you as by far the most promising of all dentifrices, worthy of a place in your caries prevention program.

### Why we put Fluoristan in CREST, instead of just adding "fluoride"

Dental scientists at Indiana University began their search for a new fluoride compound when clinical studies revealed that sodium fluoride was ineffective in a toothpaste.<sup>1</sup> Hundreds of potential anti-caries agents were tested. Stannous fluoride was found to be greatly superior to sodium fluoride, and all other agents,<sup>2,3</sup> for purposes of a toothpaste.

Conventional toothpaste ingredients inactivate fluoride. But with the aid of Procter & Gamble researchers, the scientists found a way to combine stannous fluoride with a new ingredient that maintains the activity and effectiveness of stannous fluoride in CREST. Result: Fluoristan.

#### BIBLIOGRAPHY

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doxine H Cl, 10 milligrams; riboflavin, 10 milligrams; calcium pantothenate, 50 milligrams; niacinamide, 200 to 500 milligrams; ascorbic acid, 200 milligrams to 1 gram.

### General Considerations

(1) Parenteral doses of vitamin A do not seem to be effective in raising the body's levels and it is doubtful that parenteral injections of vitamin D are required to maintain the nutrition of a patient who is unable to take it orally.

(2) In surgery, proper preoperative and postoperative diet is often second in importance only to the surgeon's skill.

(3) Where surgery is elective, it should be delayed until the patient's nutritional status is as sound as it can be made.

(4) The withholding of food preoperatively is too frequently overstressed. The average well-nourished patient can readily go without solid or semisolid food for twenty-four to forty-eight hours; however, this is not



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### 3% CARIES REDUCTION IN CHILDREN<sup>4</sup>

Summary of results published in the Feb., 1955 issue of THE JOURNAL of the AMERICAN DENTAL ASSOCIATION.

new Decayed, Missing or Filled surfaces per 100 children

50 100 150 200 250 300 350

CONTROL

CREST PREVENTED:  
146 new DMF surfaces

### 42% CARIES REDUCTION IN ADULTS<sup>6</sup>

Summary of results presented in Dec., 1954 to the Dental Section of the AMERICAN ASSOCIATION for the ADVANCEMENT OF SCIENCE.

new Decayed, Missing or Filled surfaces per 100 adults

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CONTROL

CREST PREVENTED:  
84 new DMF surfaces

### Clinical study no. 1—423 children, aged 6-16

This study, conducted by the Indiana University School of Dentistry, shows significant caries reduction after one year. Summary of results is at left above.

### Clinical study no. 2—750 grade school children

Compares CREST with a sodium fluoride dentifrice plus a control. After one year, results among CREST users confirm Study No. 1.<sup>5</sup> The sodium fluoride dentifrice was not effective in reducing caries significantly, confirming other independent studies.

### Clinical study no. 3—322 adults, aged 18-36

This test shows that the effectiveness of CREST is not restricted to children. Results appear at right above.

Six additional independent clinical studies are now in progress among over 4,000 new subjects. Summaries of the results of these studies will be made available to you soon after they are reported.



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the case in the extremely young, in those with diabetes, and in elderly patients. Hypoglycemia or acidosis, or both, may be the undesirable outcome of such starvation. These patients should be given liquid nourishment five to six hours before the operation. This may be accomplished by parenteral feedings to ensure an empty stomach.

(5) The best possible diet under the prevailing conditions is essential; that is, a full, nutritious, high-protein diet administered in sufficient

amounts to meet the energy requirements of the patient.

**Possibility of Diet Failure**—It is not enough for the surgeon to prescribe a "high protein, high caloric, high vitamin diet." Such an order may be a total failure for several reasons: (1) the diet presented to the patient may not be as specified; (2) the diet presented may not be eaten in whole or in part, because of anorexia, lack of palatability, or lack of nurses to encourage eating; (3) the food eaten may be wholly or partly

lost due to diarrhea or vomiting. The surgeon should know enough of the details of the fundamental principles of nutrition to apply them and see that they are properly carried out.

**Optimum Nutrition Desired**—There is a real difference, measured in terms of growth, development, and general health record, between optimum and merely adequate nutrition; every practical effort should be made to apply this knowledge in the interests of human welfare.

Adapted from *Oral Surgery, Oral Medicine, and Oral Pathology* 7:808-810 (Aug.) 1954.

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